Morgan County, UT Local Hazard Mitigation Plan

April 2026

Executive Summary

Background

Morgan County is defined by its mountain landscapes, river corridors and close-knit communities along the Wasatch Front. Situated between steep canyon terrain and the Weber River floodplain, the County's geography contributes both to its high quality of life and to its exposure to natural hazards. Wildfire in the wildland–urban interface, flooding along the Weber River and its tributaries, dam failure, landslides and erosion, seismic activity associated with the Wasatch Fault system, drought, severe winter storms, and other natural hazards shape the County's risk profile.

Since adoption of the FEMA-approved 2021 Hazard Mitigation Plan, Morgan County has continued to grow, particularly in Mountain Green, Morgan Valley, and west-side unincorporated areas. Residential development in foothill and canyon areas has increased the number of homes, businesses, and critical facilities exposed to wildfire, slope instability, and limited ingress and egress routes. At the same time, transportation corridors, water systems, energy infrastructure, and public facilities are experiencing greater demand, underscoring the importance of resilience planning.

Advances in hazard mapping, modeling, and data availability now provide more detailed insight into local risk conditions than was available in 2021. These tools, combined with updated demographic and development trends, support a more refined understanding of where people, property, and infrastructure are most vulnerable.

The 2026 Morgan County Hazard Mitigation Plan Update builds upon the foundation established in 2021 while reflecting current conditions, updated data, and lessons learned. It reaffirms the County's commitment to proactive, long-term strategies that reduce disaster risk, protect public safety, and support sustainable growth across Morgan County.

Purpose

The purpose of the 2026 Morgan County Local Hazard Mitigation Plan (LHMP) Update is to identify, prioritize, and guide the implementation of long-term actions that reduce risk to people, property, infrastructure, and the natural environment from natural hazards. The Plan fulfills the requirements of the Disaster Mitigation Act of 2000 and FEMA's hazard mitigation planning regulations (44 CFR §201.6), ensuring the County and participating jurisdictions remain eligible for federal mitigation funding. This update aligns with FEMA's 2025 Local Mitigation Planning Policy Guide and Local Mitigation Planning Handbook, as well as applicable Utah hazard mitigation planning requirements. Beyond compliance, the Plan serves as a strategic framework to integrate hazard mitigation into land-use decisions, capital improvement planning, infrastructure investment, and interagency coordination, supporting informed policymaking and sustainable growth across Morgan County.

Plan Goals

The mitigation goals established in the FEMA-approved 2021 Morgan County Hazard Mitigation Plan were reviewed as part of this update and determined to remain relevant to current risk conditions, growth patterns, and community priorities. Consistent with FEMA guidance encouraging continuity across plan updates, the County has carried forward these goals without modification. Collectively, they focus on protecting life and property, reducing vulnerability of critical infrastructure and essential services, strengthening interagency coordination and public awareness, and integrating hazard mitigation into land-use planning and capital investment decisions.

Plan Development

The 2026 Morgan County Hazard Mitigation Plan Update was developed through a coordinated, multi-jurisdictional process led by Morgan County in partnership with Morgan City and Morgan School District, with input from local departments, emergency services, infrastructure providers, and regional partners. The planning team reviewed updated hazard data, demographic and development trends, and infrastructure conditions; evaluated progress on actions adopted in 2021; and reassessed local regulatory and programmatic capabilities.

Plan Update and Changes

The 2026 Update reflects changes in development patterns, hazard information, and implementation progress since the 2021 Plan was adopted. Morgan County has experienced continued residential growth, particularly in foothill, canyon-adjacent, and west-side areas, increasing exposure to wildfire, flood, slope instability, and transportation access constraints. Updated hazard mapping, modeling tools, and improved data availability now provide more detailed insight into localized risk conditions, allowing for a more refined assessment of vulnerability.

Plan Use and Organization

The Morgan County Hazard Mitigation Plan serves as both a regulatory compliance document and a practical implementation guide for decision-makers. County departments, elected officials, and participating jurisdictions will use the Plan to inform land-use decisions, guide capital improvement planning, support infrastructure investments, coordinate interagency efforts, and pursue state and federal mitigation funding. The Plan is organized as a base plan supported by three jurisdiction-specific annexes: Morgan County (Unincorporated Area), Morgan City, and Morgan School District. Each annex includes a focused assessment of local hazards, jurisdiction-specific capabilities, and a tailored mitigation action plan that identifies responsible agencies, priorities, and implementation timeframes. This structure ensures that mitigation strategies are clearly aligned with each jurisdiction's authority, operational responsibilities, and risk conditions while maintaining a coordinated countywide framework.

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Section 1: Planning Process and Participation

An effective and inclusive planning process for the Morgan County Local Hazard Mitigation Plan (LHMP) is critical to ensure the updated plan utilizes the best available data, includes all necessary stakeholders, engages the public, and reflects local capabilities, values, and priorities. Through a collaborative update process, Morgan County, Morgan City, Morgan School District, and other stakeholders identified relevant hazards, analyzed hazard risks, engaged the public, and prioritized mitigation actions to reduce the risks of future hazard events.

The 2026 Morgan County LHMP was developed in accordance with the regulations outlined in the Disaster Mitigation Act of 2000 (DMA 2000), Title 44 of the Code of Federal Regulations (44 CFR), and the FEMA 2025 Local Mitigation Planning Policy Guide. FEMA requires participants to document how the plan was updated, including who was involved, how they were provided the opportunity to participate, and changes that were made in comparison to the previous plan. Participation by the public and stakeholders was critical throughout the entire update process and is described in detail in this section.

This section provides details on development and changes to each of the major sections in the plan: the risk assessment, capability assessment, mitigation strategy, implementation and maintenance, and plan adoption. This section also documents how the 2026 update differs from the 2021 Morgan County Pre-Disaster Mitigation Plan, including updates to hazard data, revised vulnerability analyses, expanded capability assessments, updated mitigation actions, and enhanced public and stakeholder engagement.

Pre-Analysis

Before hazard identification and analysis can begin, resources must be gathered to form an initial understanding of natural hazards in Morgan County. This foundational understanding informs the scope of the rest of the mitigation planning process. The pre-analysis phase consists of gathering information from state, regional, and local documents; organizing the Planning Team; and hosting the kickoff meeting for the HMP update.

Document Review

A critical first step in hazard mitigation planning is the review and incorporation of existing plans, studies, reports, and technical information. This is an opportunity to incorporate the best available data at the time of the plan update into the plan. Incorporating existing resources into the plan also ensures alignment with ongoing state and local initiatives. Some resources include the following:

- Local Mitigation Planning Policy Guide (FEMA, 2025)
- 2021 Morgan County Pre-Disaster Mitigation Plan

- 2024 Utah Enhanced State Hazard Mitigation Plan
- 2010 Morgan County General Plan

Consistent with FEMA's 2025 Local Mitigation Planning Policy Guide, the Planning Team prioritized the use of the best available data at the time of the update, including the most current federal, state, regional, and local datasets, reports, and modeling resources relevant to Morgan County and participating jurisdictions.

Planning Process Methodology

Funding

The 2025 Morgan County LHMP has been successfully funded through the FEMA Hazard Mitigation Grant Program (HMGP) and local match contributions provided by participating jurisdictions. Funding sources and match requirements were coordinated through Morgan County Emergency Management in accordance with FEMA planning grant requirements. This funding will enable the implementation of essential hazard mitigation strategies to reduce the plan participant's vulnerability to natural disasters and other emergencies. The collaboration between HMGP and plan participants underscores the commitment to proactive disaster risk reduction and resilience building. This funding structure supports the development of a single, coordinated multijurisdictional plan rather than separate jurisdiction-specific planning efforts.

Schedule

Hazard mitigation planning in the United States is guided by the statutory regulations described in the Disaster Mitigation Act (DMA) 2000 and implemented through 44 Code of Federal Regulations (CFR) Parts 201 and 206. FEMA's guidelines outline a four-step planning process for developing and approving HMPs.

A planning process was created to develop the HMP based on the various federal guidance documents and regulations. Figure 1 shows the four major components of the HMP planning process: organizing resources, assessing risk, developing the mitigation action strategy, and adopting and implementing the plan.

Figure 1: Multijurisdictional Hazard Mitigation Planning Process

Since each of the steps in the planning process builds off the previous one, they were completed in chronological order with meetings designated for each step. Table 1 provides a list of the scheduled meetings pertinent to developing and implementing the hazard mitigation plan, outlining the specific dates for each meeting and the types of meetings conducted. These meetings were critical for facilitating collaboration among plan participants and ensuring that all aspects of the plan are thoroughly discussed and addressed. Both plan participants and stakeholders were invited.

Table 1: Planning Team Meetings

Meeting	Date
Kickoff Meeting	9/18/2025
Risk Assessment Meeting	11/7/2025
Mitigation Strategy Meeting	12/11/2025

Additional 1:1 meetings were held with each of the plan participants to review their draft annexes and mitigation actions as well.

Participation

Plan Participant Engagement

The development of the 2026 Morgan County LHMP was a multijurisdictional effort encompassing all the jurisdictions represented by the plan. The plan participants met regularly to identify, discuss, and recommend changes to maintain and update the plan. Each jurisdiction participated in the development of the plan and was a full and integral member of the review and decision process.

The plan participants included Morgan County, including its unincorporated areas, Morgan City, and Morgan County School District. To satisfy multijurisdictional plan participation requirements, the county and participating jurisdictions designated participants to perform the following tasks:

- Participate in HMP update meetings
- Provide data for the Hazard Analysis and Risk Assessment
- Provide the current status of previous mitigation actions
- Identify potential mitigation projects
- Support public engagement
- Adopt the finalized HMP

Table 2: Plan Participants

Name	Title	Department/Agency	Jurisdiction/Organization
Andy Jensen	Superintendent	District Leadership	Morgan School District
Boyd Carrigan	Fire Chief	Fire Department	Morgan County
Erica White	EMS Director	Fire Department	Morgan County
Josh Cook	Planning Director	Planning and Development	Morgan County
Scott McMillan	Business Administrator	Business Services	Morgan School District
Shaun Rose	Recorder	Recorder's Office	Morgan County
Ty Bailey	City Manager	Administration	Morgan City

Stakeholder Involvement

For hazard mitigation planning, stakeholders are individuals or groups that have a vested interest in the resilience of communities involved in the planning process. They play a crucial role in shaping the plan and its contents. Their various expertise, perspectives, and insights can significantly influence the direction and effectiveness of each section of the plan. Stakeholders received email invitations to join the planning

meetings and were encouraged to participate. Additionally, all stakeholders had the opportunity to review and provide feedback on the draft plan.

Table 3 provides a detailed overview of stakeholders invited to participate in the planning process, highlighting their roles, agency, and stakeholder type. The representatives from various agencies and their titles showcase the diversity of individuals involved in community governance and public service. Identifying and acknowledging these stakeholders can better demonstrate the dynamics of local administration and the importance of cooperation in addressing community needs and challenges.

Table 3: Stakeholders Invited to Participate

Name	Title	Department/Agency	Type of Stakeholder
Ben Sessions	President	Peterson Pipeline Association	Business/Private Organization
Bill Coutts	Chairman	Mountain Green Sewer Improvement District	Development Regulatory Authority
Boyd Carrigan	Fire Chief/Emergency Medical Services (EMS) Director	Morgan County Fire and EMS	Development Regulatory Authority
Bret Heiner	Director	Morgan County Public Works	Development Regulatory Authority
Brian Brendel	Fire Chief	Mountain Green Fire Protection	Development Regulatory Authority
Bruce Clark	President	North Morgan Irrigation Company	Business/Private Organization
Clark Cook	Power Foreman/Emergency Contact	Morgan City Power	Development Regulatory Authority
Corey Stark	Sheriff	Morgan County Sheriff's Office	Local/Regional Agency
Darcie Harris	Manager	Morgan Secondary Water Association	Business/Private Organization
Dave Rich	Fire Marshal	Morgan County Fire and EMS	Development Regulatory Authority
Dennis Peterson	Golf Course Director	Round Valley Country Club	Business/Private Organization
Dlynn Poll	Manager	Mountain Green Subdivision Water Association	Nonprofit/Community-Based Organization
Eric Brandshaw	Manager	East Canyon State Park	Local/Regional Agency

Name	Title	Department/Agency	Type of Stakeholder
Gaylene Adams	President	Morgan School District	Local/Regional Agency
Jaime Eugene Grandpre	Water Master	Hidden Hollow Water Company	Business/Private Organization
Jaime Gomez	Quality Control Manager	Amrize	Business/Private Organization
Jared Anderson	Trustee - Morgan County	Weber Basin Water Conservancy District	Local/Regional Agency
Jason Morgan	Chair	Morgan Conservation District - Utah Department of Agriculture and Food	Local/Regional Agency
Julie Bjornstad	Long-Range Planning Deputy Director	Wasatch Front Regional Council	Local/Regional Agency
Kale Watkins	Water/Wastewater Senior Operator	Morgan City Public Works	Development Regulatory Authority
Kale Watkins	Water Superintendent	Morgan City Municipal Water	Development Regulatory Authority
Kathryn McMullin	Emergency Manager	Summit County	Neighboring Community
Kevin Linn Baggs	Facilities Manager	Browning Company	Business/Private Organization
Kevin Thurston	Supervisor	Morgan Conservation District - Utah Department of Agriculture and Food	Local/Regional Agency
Lisa Schwartz-Gosline	Emergency Manager	Weber County	Neighboring Community
Marie Owns	Drinking Water Specialist	Milton Church and Morgan Fifth and sixth Wards	Nonprofit/Community-Based Organization
Mike Baker	Floor Manager	Taggarts Grill	Business/Private Organization
Mike Johanson	General Manager	Cottonwood Mutual Water Company	Business/Private Organization
Mike Newton	Commissioner	Morgan County	Local/Regional Agency
Nate Bell	Supervisor	Wasatch Peaks Ranch	Business/Private Organization

Name	Title	Department/Agency	Type of Stakeholder
Nathan Bell	District Manager	Wasatch Peaks Ranch Utility and Roads District	Local/Regional Agency
Nathan Hadley	Assistant Manager	Highlands Water Company	Business/Private Organization
Richard L. Wiscombe	Secretary	Richville Pipeline Company	Business/Private Organization
Shawn Waller	Deputy Chief	Morgan County Fire and EMS	Development Regulatory Authority
Skyler Pyle	Emergency Services Program Manager	Weber-Morgan Health Department	Local/Regional Agency
Steve Pentz	President	Croydon Pipeline Company	Business/Private Organization
Teresa Shope	Administrative Lead - Planning and Zoning	Morgan City	Development Regulatory Authority
Tyler Wood	President	Central Enterprise Water Association	Business/Private Organization

Table 4: Stakeholders that Participated in the LHMP Update

Name	Title	Department/Agency	Type of Stakeholder
Becca Parkinson	Welfare and Self-Reliance Manager	The Church of Jesus Christ of Latter-day Saints	Nonprofit/Community-Based Organization
Brent Wallace	Welfare and Self-Reliance Service Missionary	The Church of Jesus Christ of Latter-day Saints	Nonprofit/Community-Based Organization
Brian Brendel	Fire Chief	Mountain Green Fire Protection District	Development Regulatory Authority
Erica White	Emergency Manager/ EMS Director	Morgan County	Local/Regional Agency
Jaime Gomez	Quality Manager	Devils Slide Cement Plant	Business/Private Organization
Jared Egbert	HR Director	Browning	Business/Private Organization
Kate Becker	Administrative Manager	Morgan County	Local/Regional Agency

Name	Title	Department/Agency	Type of Stakeholder
Kathryn McMullin	Emergency Manager	Summit County	Neighboring Community
Lance Hopfenbeck	Vice President	Browning	Business/Private Organization
Leslie Hyde	Clerk/Auditor	Morgan County	Local/Regional Agency
Lisa Gosline	Emergency Manager	Weber County	Neighboring Community
Marjalee Smith	President	Highlands Water Company	Business/Private Organization
Mike Johanson	General Manager	Cottonwood Mutual Water	Business/Private Organization
Nathan Bell	District Manager	Wasatch Peaks Ranch Utility and Roads District	Local/Regional Agency
Scott McMillan	Business Administrator	Morgan County School District	Local/Regional Agency
Skyler Pyle	Emergency Services Program Manager	Weber-Morgan Health Department	Local/Regional Agency
Ty Bailey	City Manager	Morgan City	Local/Regional Agency

Public Involvement

Public involvement is a major and required component of each HMP update. Public engagement and involvement is required under FEMA (44 CFR § 201.6(b)(1)). The insight and feedback provided by the public throughout the planning process helps to ensure residents' experiences are reflected in the final HMP update. This is particularly true for underserved and vulnerable populations that are often impacted adversely by natural hazards.

For this HMP update, opportunities for public engagement were provided both in-person and digitally through an online survey. The plan participants recognized the challenge in gathering public involvement through in-person means only and the digital survey was created to give residents and stakeholders additional options to provide feedback.

DIGITAL SURVEY

The digital survey was created to allow members of the public a convenient way to provide feedback on the HMP. Morgan County, Morgan City, and Morgan County School District shared the survey via social media and in-person via meetings and publicly posted signage. Signage was posted at local grocery stores, post office, county library, city building, county building, 2 pharmacies, 2 hardware stores, 3 local businesses, 1 restaurant, and multiple government and local neighborhood groups on social media which

are active throughout the County. Additionally, the School District shared the survey via their weekly email to parents.

This 13-question survey asked residents about hazards of concern, vulnerable areas in their communities, disaster education and awareness, and mitigation action ideas among other questions. Thirty-five responses were received from a mixture of residents, people who work in the participating jurisdictions, business owners, property owners, and local agency employees. Responses were spread out between residents of Morgan City, Mountain Green, Croydon, Peterson, Enterprise, and other communities. Respondents were most concerned about wildfire, earthquakes, and flooding impacting them, their homes, or businesses. In terms of vulnerable locations, respondents highlighted roads and bridges as well as mountain and canyon communities. When asked what would help reduce risk in the community, respondents asked for more grants or cost-sharing programs for property upgrades and more information on hazard risks. Survey results were used to inform hazard prioritization, identify vulnerable locations, and refine mitigation actions included in the final plan.

Figure 2 Public Survey Posted in Morgan City

IN-PERSON MEETINGS

Morgan County hosted in-person engagement opportunities during the Morgan County Fire open houses at stations 121 and 141. The meetings were open to all and advertised on social media, as well as on flyers posted at community facilities and stores around the planning area. The public was invited to learn more about fire safety, tour the station, and talk to the Morgan County Emergency Manager about the county's hazard mitigation plan. The Morgan County Emergency Management passed out approximately 100 digital survey flyers at these events and spoke to approximately 50 people at the open house for station 121 on Saturday, October 11, 2025 and 25-30 people at the open house for station 141 on Saturday, October 25th. Residents shared their lived experiences with disasters in Morgan County and concerns with

a range of hazards. They also shared ideas on mitigation actions that could reduce the risks they have experienced. Those concerns and experiences were noted and integrated into the risk assessment and mitigation strategies sections of the plan.

PUBLIC REVIEW

The public comment period on the draft plan provides the public with a final opportunity to add their input to the draft. The draft plan was available online from [date] to [date] and shared by the plan participants via their websites and social media accounts. The public was invited to view and provide comment on the draft plan by reaching out to the IEM Project Manager. All comments received were carefully reviewed and incorporated into the plan as appropriate.

Plan Update and Development

Risk Assessment Summary

The risk assessment section provides a comprehensive evaluation of potential hazards that could impact the community. It identifies natural hazards to be included in the plan and analyzes the historical and projected future impact from them. The hazards profiled for this plan include the following:

- Avalanche
- Dam Failure
- Drought
- Earthquake
- Erosion
- Extreme Cold
- Flood
- Hail
- High Winds
- Landslide
- Problem Soils
- Radon
- Snowstorm
- Wildfire

The analysis focuses on vulnerabilities of critical infrastructure, residential and commercial areas, and populations, with a particular focus on high-risk zones. The assessment incorporates historical data; federal, state, and local planning resources; and predictive modeling to estimate the likelihood and potential consequences of each hazard, thereby ranking risks based on their severity and frequency.

Capability Assessment

The capability assessment section outlines the existing resources, programs, and policies that the county, city, and school district and its partners have in place to support hazard mitigation and emergency management. It assesses the strengths and opportunities to improve current capabilities, including staffing, funding, training, and equipment within local government agencies, emergency services, and nonprofit organizations. The section highlights existing plans, such as emergency operations plans and

land-use regulations, that contribute to risk reduction and resilience-building efforts. Additionally, it outlines how plan participants can enhance these capabilities through collaboration, training, and community engagement, ensuring that stakeholders are better prepared to respond to and recover from potential hazards. This comprehensive evaluation serves as a foundation for developing targeted strategies to improve overall mitigation efforts in Morgan County, Morgan City, and the Morgan County School District.

Mitigation Strategy

The mitigation strategy section develops a comprehensive framework for reducing the risks associated with identified hazards while enhancing community resilience through a series of mitigation actions and projects. Each action and project is tailored to address specific vulnerabilities and hazards faced by the plan participants. The mitigation actions in this plan fall into four types of projects: plan and regulations, structure and infrastructure, education and awareness, and natural systems protection. Each of these types of actions play an important role in improving the resilience of Morgan County, Morgan City, and the Morgan County School District.

The section also emphasizes collaboration among local agencies, stakeholders, and the community to foster a unified approach to hazard mitigation. Additionally, it incorporates timelines, responsible parties, and potential funding sources for each action, ensuring a clear pathway for implementation. The mitigation strategy reflects a proactive commitment to safeguarding residents and their assets from future hazards while promoting sustainable development practices.

Plan Maintenance

The hazard mitigation process does not end once the plan is complete. The mitigation actions identified in the mitigation strategy need to be implemented by participating jurisdictions. The implementation section outlines a clear framework for putting the identified mitigation strategies into action. It specifies the roles and responsibilities of various local agencies, stakeholders, and community organizations involved in the execution of the plan, ensuring that everyone understands their contributions to enhancing community resilience. By establishing mechanisms for ongoing monitoring and evaluation, this section ensures that the mitigation strategies remain effective and relevant over time.

The maintenance section defines processes and practices necessary to ensure the plan remains up to date over time. It specifies a schedule for regular reviews and updates of the plan, which will occur at least every five years or following significant changes in local conditions, hazard occurrences, or community priorities. The section emphasizes the importance of ongoing stakeholder engagement, including input from local agencies, community members, and organizations involved in hazard mitigation efforts.

Plan Adoption

This final section, plan adoption, sets out the formal process through which the plan is approved and endorsed by plan participants. The formal approval by local governing bodies is a critical step in the mitigation planning process. Without formal approval, eligibility for certain federal funding and resources for hazard mitigation projects can be denied. Each participating jurisdiction will formally adopt the plan through its own governing body, consistent with FEMA requirements for multijurisdictional hazard mitigation plans. Jurisdictions will provide documentation showing that formal approval has taken place.

Section 2: Community Profile

This section provides an overview of Morgan County, Utah, including the community's physical setting, history, demographics, land use, and infrastructure. The Community Profile establishes the baseline context that informs the development of hazard mitigation strategies tailored to the County's unique environmental and socioeconomic characteristics.

Setting and Location

Morgan County is located in the northern portion of the state of Utah and encompasses approximately 611 square miles (1,582 km^2) of land area. The County lies within the Wasatch Back region and is part of the Ogden-Clearfield Metropolitan Statistical Area. It is bordered by Weber County to the northwest, Davis County to the west, Summit County to the southeast, and Rich County to the northeast. The County seat is the City of Morgan, located near the geographic center of the County.

The terrain of Morgan County is mountainous and scenic, defined by the Wasatch Range to the west and the Uinta Mountains to the east. Elevations in the County range from approximately 4,700 feet in the valley floors to over 9,000 feet in the surrounding mountains, contributing to varied weather patterns and hazard exposure - particularly in terms of landslides, flooding, and wildfire risk.

Morgan County's transportation network includes Interstate 84 (I-84), which runs east–west through the County and serves as a critical connection between Ogden and the Uintas, with additional access via State Route 66 (SR-66), linking Morgan City to East Canyon and Henefer. These routes are vital for commuter traffic, freight movement, emergency response, and seasonal recreation access.

The Weber River flows through the County from east to west, supporting agriculture, recreation, and ecosystem services while also posing localized flood risks. Prominent recreation areas such as East Canyon State Park, Lost Creek Reservoir, and large tracts of national forestland reflect the County's outdoor-oriented character and its reliance on nature-based assets. Figure 3 provides an overview of the planning area.

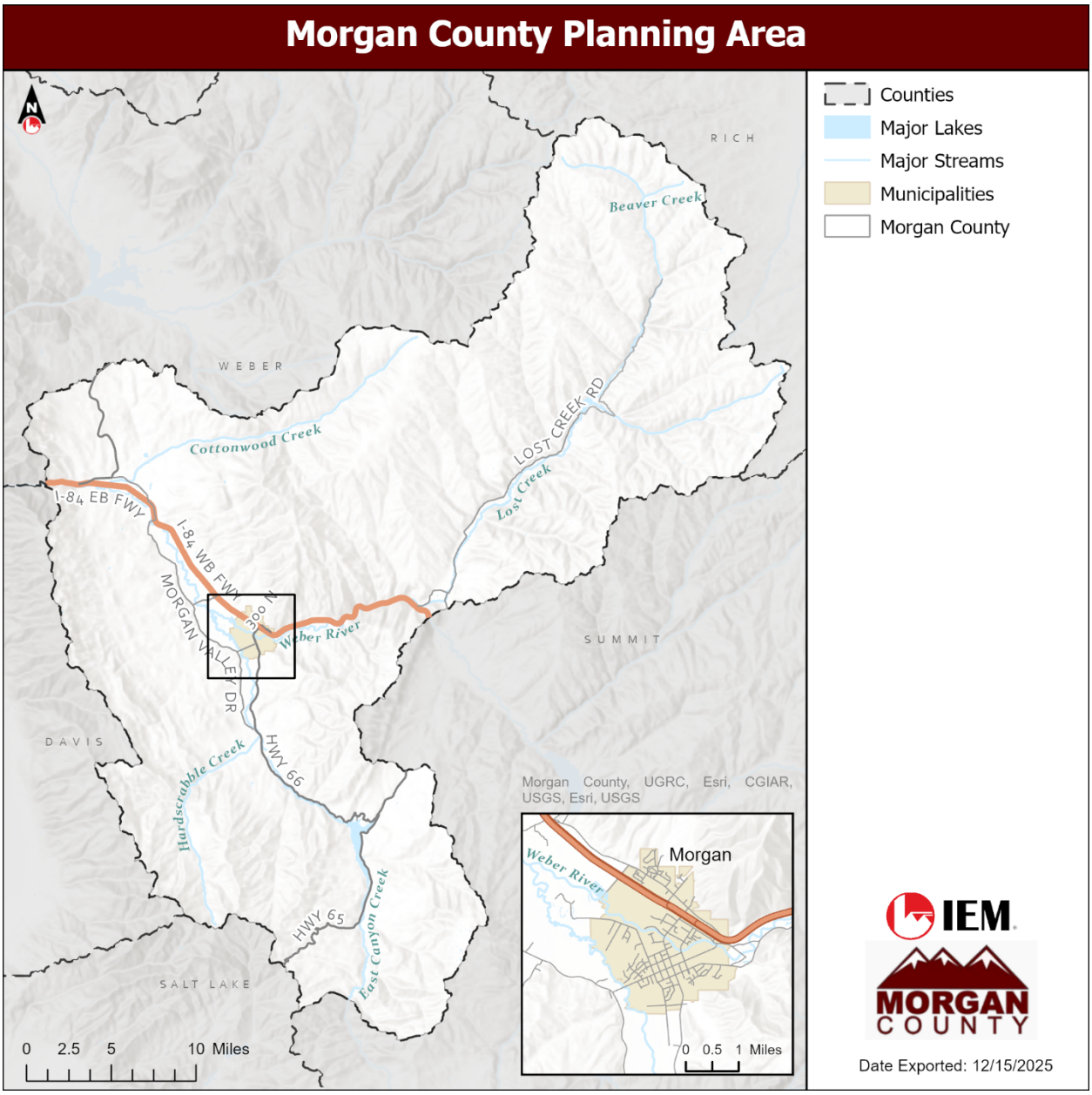


Figure 3: Morgan County Planning Area Overview

The landscape is predominantly rural, with small towns, ranchland, irrigated fields, and low-density residential development scattered throughout mountain valleys. While growth has been modest, pressure for suburban expansion is increasing due to the County's proximity to the Wasatch Front urban corridor. Figure 4 shows land cover throughout Morgan County, including developed land, agricultural areas, and vegetation types in undeveloped areas.

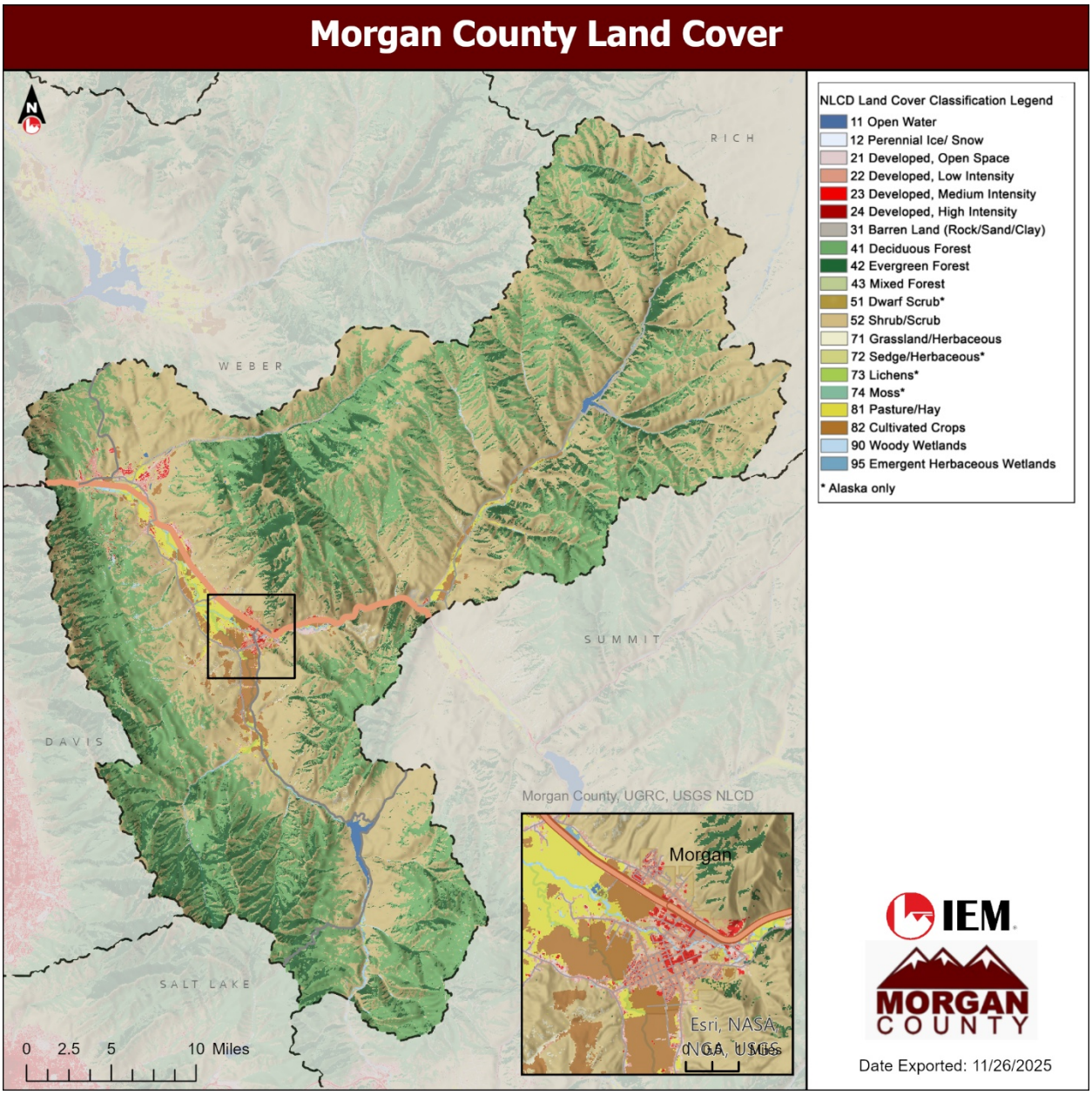


Figure 4: Land Cover in Morgan County

History

Morgan County has a rich historical legacy shaped by Indigenous habitation, pioneer settlement, and its strategic location along early transportation routes through the Wasatch Mountains. Prior to European-American settlement, the region was seasonally occupied by the Northern Shoshone and Goshute tribes, who relied on hunting, fishing, and gathering in the foothills and along the Weber River corridor. These Indigenous groups had an adaptive lifestyle attuned to the area's high-elevation valleys, harsh winters, and seasonal resource availability.

The first recorded European-American presence in the area came with trappers and explorers in the early 19th century. The area gained more permanent settlement following the arrival of Mormon pioneers. In 1860, the Utah Territorial Legislature officially created Morgan County, named in honor of Jedediah Morgan Grant, a prominent early Mormon leader and father of future Church of Jesus Christ of Latter-Day Saints (LDS) Church President Heber J. Grant.

Settlement was concentrated along the Weber River, where early settlers established irrigation systems and small agricultural communities. Morgan City, incorporated in 1868, developed as the County seat and main population center. Morgan's economy initially revolved around farming, livestock grazing, and timber harvesting, with the development of mills and railroads - particularly the arrival of the Union Pacific Railroad - boosting local commerce in the late 19th century.

Morgan County's geography - nestled between the Wasatch and Uinta Mountain Ranges - has long made it a strategic transportation corridor. The County sits along the historic Transcontinental Railroad route, and today I-84 parallels this path, reinforcing Morgan County's location as a connector between northern Utah and the Mountain West.

The 20th and 21st centuries brought gradual but consistent growth, with agriculture remaining central to the local economy, augmented by recreation, limited industry, and exurban residential development. The development of East Canyon and Lost Creek reservoirs, as well as proximity to regional open space and recreation destinations, have made Morgan a gateway for outdoor tourism and second-home development.

Today, Morgan County is characterized by its balance of traditional rural land uses and growing development pressure from the expanding Wasatch Front urban corridor. According to the 2020 U.S. Census, Morgan County had a population of 12,295, reflecting one of the fastest growth rates in Utah over the past decade—a trend anticipated to continue.

Climate

Morgan County experiences a humid continental climate (Dfb) with notable elevation-driven variation and four distinct seasons. The climate is characterized by cold, snowy winters; warm to hot summers; and moderate annual precipitation that is spread throughout the year but peaks during the spring and fall.

Elevations across the County range from about 4,700 feet (1,433 m) in the valley areas to over 9,000 feet (2,743 m) in the surrounding Wasatch and Uinta Mountain Ranges. This topographic diversity contributes to local microclimates that influence snowpack, stormwater runoff, and wildfire potential. The Weber River, which bisects the County, and nearby East Canyon and Lost Creek reservoirs play important roles in regional hydrology, irrigation, and seasonal weather patterns.

Average summer high temperatures in Morgan City reach approximately 86°F to 91°F (30–33°C) in July and August, while winter lows frequently dip below 20°F (−6°C) in January. Snowfall is common and often

heavy in the winter months, with Morgan receiving approximately 60–80 inches of snow annually, while higher elevations see significantly more.

Morgan County receives an average of 20–24 inches (500–610 mm) of precipitation annually, with April, May, and October typically being the wettest months. Thunderstorms are common during the late spring and summer, occasionally resulting in localized flash flooding, particularly in canyon areas and near burn scars. Snowmelt and heavy spring precipitation also pose risks of riverine flooding, especially along the Weber River and its tributaries. Table 5 lists the average temperature and precipitation by month for Morgan County.

Table 5: Average Temperature and Precipitation by Month in Morgan County[1]

Month	Average High (°F)	Average Low (°F)	Average Precipitation (inches)
January	36	17	1.8
February	42	22	1.6
March	51	29	2.0
April	60	35	2.1
May	69	43	2.3
June	80	51	1.5
July	88	58	1.0
August	86	57	1.3
September	77	49	1.4
October	64	39	2.0
November	48	29	1.7
December	37	20	1.5

The County averages 190 to 210 sunny days per year, with lower humidity and greater diurnal temperature swings compared to Utah's urban centers. Summer afternoons can be hot and dry, but nighttime temperatures often drop significantly, offering some relief. Wildfire risk is elevated in summer and fall months due to persistent drought conditions, dry fuels, and strong canyon winds.

Climate extremes of concern include the following:

- Drought (linked to longer-term regional water stress)
- Wildfire (especially in wildland-urban interface [WUI] areas and state park buffer zones)

[1] Climate data sources: National Oceanic and Atmospheric Administration National Centers for Environmental Information (NOAA NCEI) U.S. Climate Normals, https://www.ncei.noaa.gov/access/us-climate-normals/ ; Parameter-elevation Regressions on Independent Slopes Model (PRISM) Climate Group; Utah Climate Center (1991–2020 normals).

- Flooding (from both snowmelt and convective storms)
- Severe winter storms and avalanche (in high elevation areas)

Due to its mountainous terrain and winter snowfall, Morgan County is susceptible to snowpack variability and changing hydrology from climate change. Increased winter rain-on-snow events, earlier snowmelt, and prolonged dry periods are expected to influence flood risks, wildfire regimes, and water resource planning in the decades ahead.

Demographics

Morgan County has experienced steady population growth over the past several decades, driven by its proximity to the expanding Wasatch Front, high quality of life, and appeal as a rural–exurban community within commuting distance to employment centers in Weber, Davis, and Salt Lake Counties. Unlike more urbanized areas of Utah, Morgan County's growth has primarily occurred through low-density residential development concentrated in the Morgan Valley, with limited commercial and industrial expansion.

Between 2000 and 2020, the County's population increased from 7,129 to 12,295, representing a 72.4% increase over two decades - one of the fastest rates in the state during that period. As of 2024, Morgan County is home to approximately 13,039 residents.[2]

For Morgan City, the population rose from 2,673 to 4,071 between 2000 and 2020, a 52.3% increase. The U.S. Census Bureau estimates the 2023 population at 4,268, showing a continued trajectory of population growth.

The COVID-19 pandemic did not significantly stall growth in the County; Morgan County saw continued in-migration, particularly among households seeking more space, access to outdoor amenities, and lower-density living conditions. As regional housing affordability challenges persist in urban Utah, Morgan County is projected to maintain moderate-to-high growth through 2050.

Population and Racial/Ethnic Composition

Morgan County is among Utah's least racially and ethnically diverse counties, with the population being predominantly non-Hispanic White. However, gradual demographic shifts - especially among younger residents - are increasing the representation of Hispanic and multiracial households.

[2] U.S. Census Bureau, "U.S. Census Bureau QuickFacts: Morgan County, Utah," 2024, https://www.census.gov/quickfacts/fact/table/morgancountyutah/POP815223.

- **Population Overview (2023 Estimate)**[3]
  - Total Population: 12,585
  - Sex:
    - Male: 51.9%
    - Female: 48.1%
  - Median Age: 32.5 years
  - Age:
    - Under 18 years: 34%
    - 65 years and over: 12.1%
- **Race and Hispanic Origin**[4]
  - White (Non-Hispanic): 94.3%
  - Hispanic or Latino (of any race): 2.9%
  - Two or More Races: 2.8%
  - American Indian and Alaska Native: 0.1%
  - Black or African American: 0.2%
  - Asian: 0.3%
  - Native Hawaiian or Other Pacific Islander: 0.5%
- **Educational Attainment (Age 25 and Older)**[5]
  - High school graduate or higher: 97.6%
  - Bachelor's degree or higher: 38.8%
  - Graduate or professional degree: 14.3%
  - No high school diploma: 2.4%

These levels of educational attainment are significantly higher than the average for Utah's rural counties, reflecting the County's commuter and professional population profile.

Figure 5 shows the population density of Morgan County.

[3] U.S. Census Bureau, "DP05 ACS Demographic and Housing Estimates," 2023, https://data.census.gov/table/ACSDP5Y2023.DP05?q=population+morgan+county+ut.
[4] U.S. Census Bureau, "DP05 ACS Demographic and Housing Estimates," 2023, https://data.census.gov/table/ACSDP5Y2023.DP05?q=population+morgan+county+ut.
[5] U.S. Census Bureau, "S1501 Educational Attainment," 2023, https://data.census.gov/table?q=educational+attainment+morgan+county+ut.

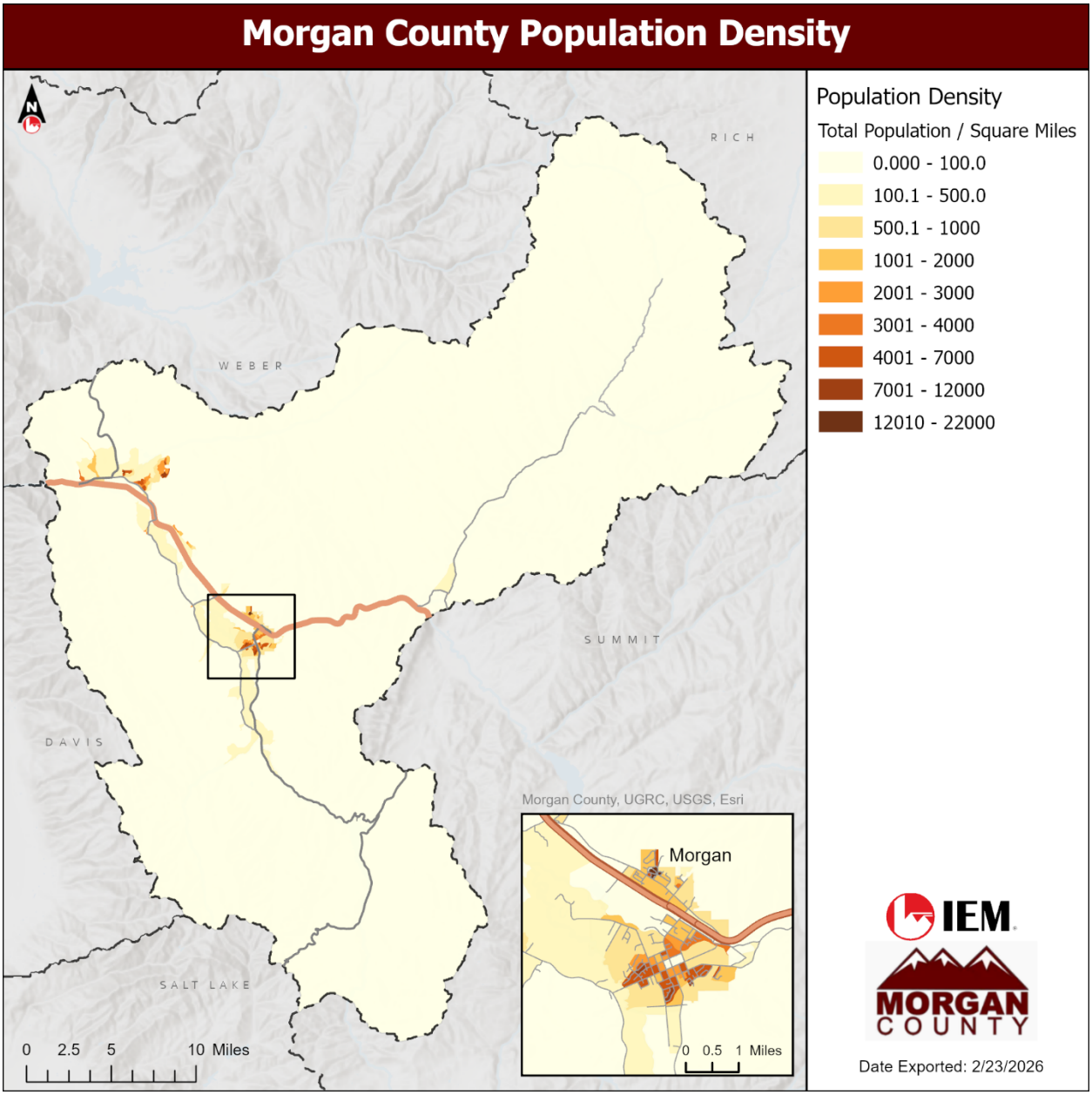


Figure 5: Morgan County Population Density

Income and Economy

Morgan County has one of the highest median household incomes among Utah's rural counties. As of the 2022 American Community Survey (ACS) 5-Year Estimates, the following income and poverty statistics apply:

- **Median Household Income:** $108,309
- **Per Capita Income:** $39,810
- **Poverty Rate:** 4.6% (well below the state average of approximately 9.8%)

The County's economy is rooted in agriculture, construction, small business services, and commuter-based employment in the Wasatch Front. Most residents work outside the County, and their employment is concentrated in the following sectors:

- Education and public administration
- Construction and skilled trades
- Professional, scientific, and technical services
- Health care and social assistance

Morgan County's low unemployment rate (typically below 2.5%) reflects both its small labor force and regional employment access. However, the local economy remains sensitive to changes in housing, transportation access, and Wasatch Front labor market conditions.

Housing and Development

Historically rural and agricultural in character, Morgan County's housing stock reflects its development as a commuter and recreational community situated between the Wasatch Front and Utah's mountain interior. The earliest homes in the area were constructed in the late 19th and early 20th centuries by Mormon settlers, often as farmsteads or clustered within small centers like Morgan City, Mountain Green, and Enterprise.

By the 1990s, Morgan County began to see more substantial residential growth driven by in-migration from Weber, Davis, and Salt Lake Counties. This expansion accelerated in the 2000s and 2010s, as families sought larger lots, scenic views, and lower-density living within commuting distance of the Wasatch Front.

As of 2022, Morgan County had an estimated 4,033 total housing units, with owner-occupied single-family detached homes accounting for over 85% of all residential structures. Development has predominantly consisted of low-density subdivisions, especially in unincorporated areas like Mountain Green, where larger-lot, upscale homes have become increasingly common. Manufactured housing is limited, and multi-family housing options are extremely scarce, contributing to a limited affordable and rental housing supply.

As shown in Figure 6, most land in Morgan County is privately owned. Other major landowners include the U.S. Forest Service, Bureau of Land Management, and the Utah Department of Natural Resources, which manages wildlife reserve and management areas, as well as East Canyon State Park.

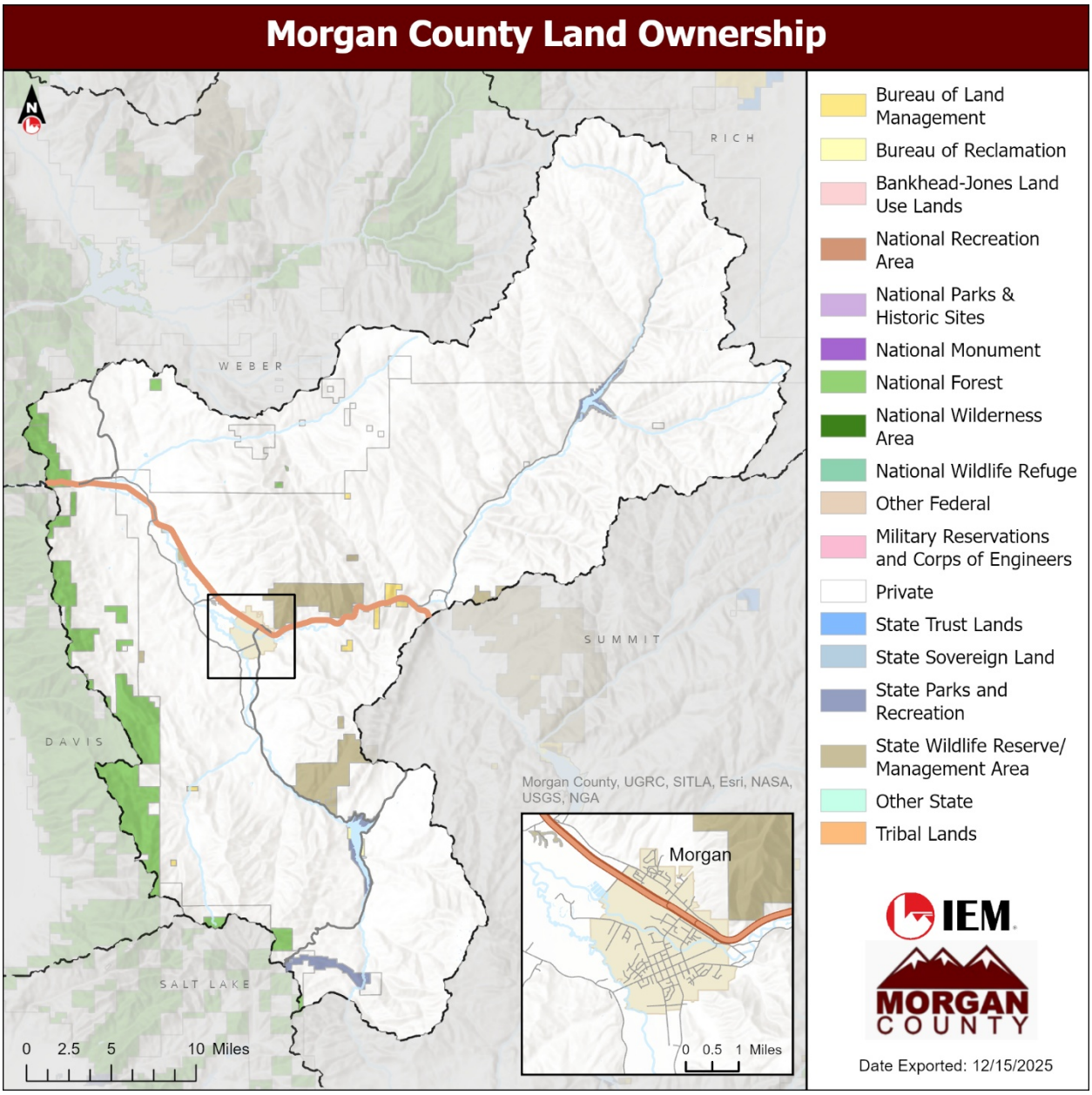


Figure 6: Land Ownership in Morgan County

Current Housing Market Trends

Morgan County's housing market remains highly competitive due to strong demand, limited inventory, and geographic constraints on new development. As of the earliest reliable data available (2025), the median home sale price in Morgan County was approximately $643,000, a 41% increase since 2020, based on Multiple Listing Service (MLS) data and Zillow's Home Value Index. In Mountain Green, median home prices routinely exceed $700,000, driven by newer construction and larger lot sizes.

Housing production remains lower than regional demand, with permitting constrained by infrastructure capacity (e.g., sewer, road access) and land availability in developable valley areas. The Morgan County General Plan identifies a need for more housing diversity to support workforce retention, aging in place, and attainable options for young families.

Despite rapid price appreciation, Morgan County remains more affordable than some parts of Summit County or the Park City area, making it attractive to exurban commuters. However, housing affordability challenges are increasing, with many essential workers priced out of local ownership opportunities.

Rental Market and Tenure

The rental market in Morgan County is extremely limited, with a homeownership rate of approximately 91.5% - one of the highest in Utah. Just 8.5% of occupied housing units are renter-occupied, and vacancy rates are very low.

There are few multifamily or large-scale rental developments, and rental listings are often limited to single-family homes or accessory dwelling units. As of late 2024, median gross rent in the County was approximately $1,425 per month, though actual availability is constrained, and monthly rates can be higher in Mountain Green or Morgan City due to limited supply.

Housing Characteristics and Affordability

Most homes in Morgan County are recently built, with over 52% of housing units constructed since 2000, according to the ACS. Homes tend to be larger than the state average, often exceeding 2,500 to 3,000 square feet, and situated on quarter-acre to one-acre parcels. The following indicators summarize key housing characteristics in the County:

- Median Selected Monthly Owner Costs (with Mortgage): $2,193
- Persons per Household: 3.36
- Vacancy Rate (All Housing Units): 6.5%
- Seasonal/Vacation Use Housing: Less than 2%, though second-home ownership is increasing in certain areas

While high incomes and low unemployment support housing affordability for many households, rising prices and limited rental stock pose equity challenges for lower-income and younger residents. The Morgan County General Plan (2022) identifies housing affordability, diversity, and infrastructure readiness as key planning challenges for the coming decade. Table 6 shows housing and occupancy data for Morgan County in 2023.

Table 6: Housing and Occupancy Data for Morgan County, 2023

Metric	Value
Total households	3,674
Owner-occupied housing rate	91.5%
Median home price (2025)	$643,000
Median selected monthly owner costs	$2,193
Median gross rent	$1,425
Persons per household	3.36
Vacancy rate	6.5%

Economy

Morgan County's economy is shaped by its rural and agricultural heritage, proximity to the Wasatch Front urban corridor, and growing role as a residential commuter community. While agriculture and livestock remain culturally and economically significant, the majority of working residents are employed outside of the County, commuting to Weber, Davis, and Salt Lake Counties for jobs in healthcare, education, government, and professional services. This reliance on external employment links Morgan's economic future closely to regional development patterns along the Wasatch Front.

According to the U.S. Census Bureau, Morgan County had an employment base of roughly 5,755 workers, with an unemployment rate consistently among the lowest in Utah - 2.2% in 2023. Median household income in the County was $126,092, among the highest of Utah's rural counties, reflecting the professional and managerial occupations of many commuting households.[6]

Tourism and Hospitality

Tourism plays an increasing but still modest role in Morgan County's economy. The County's natural and recreational assets - including East Canyon State Park, Lost Creek State Park, Weber River fisheries, and extensive hunting, hiking, and camping areas - draw seasonal visitors. Outdoor recreation and tourism-related businesses support local restaurants, lodging, and guiding services.

Although tourism does not yet represent a large share of employment, the Utah Office of Tourism identifies Morgan County as an emerging destination for river recreation, state parks, and scenic byways. Seasonal visitor spending contributes to sales tax revenue and supports small businesses, particularly in Morgan City and unincorporated town centers.

[6] U.S. Census Bureau, " DP03 Selected Economic Characteristics," 2023, https://data.census.gov/table/ACSDP5Y2023.DP03?q=employment+morgan+county+utah&g=050XX00US4902.

Retail and Commercial Services

Morgan County's retail economy is limited compared to its urban neighbors, with Morgan City serving as the County's primary commercial hub. Local businesses include grocery stores, service stations, hardware and building supply stores, small restaurants, and automotive services. Residents frequently travel to Ogden, Layton, or Salt Lake City for major retail, healthcare, and specialty goods, underscoring the County's reliance on neighboring markets.

Sales tax revenue in Morgan County has grown steadily, supported by both population growth and increased visitor spending at recreation-related businesses. However, the County's limited commercial base constrains local job creation and contributes to a high volume of outbound commuting.

Agriculture and Resource-Based Industries

Agriculture remains a defining feature of Morgan County's identity. The County supports cattle ranching, hay and alfalfa production, and irrigated cropland along the Weber River and in valley bottoms. According to the USDA's 2022 Census of Agriculture, Morgan County had 363 farms and 225,858 acres in agricultural use.[7] Resource extraction, such as quarrying and timber harvesting, has historically contributed to the economy but now plays a limited role compared to residential growth and service industries.

Construction and Real Estate

Construction is one of the County's strongest local employment sectors, driven by rapid residential growth in Mountain Green and other unincorporated areas. The Morgan County General Plan (2022) anticipates continued residential expansion, with demand for higher-value homes on large lots fueling the local real estate market. While this growth boosts construction and real estate services, it also heightens concerns about infrastructure capacity, housing affordability, and hazard exposure in WUI zones.

Employment

Employment in Morgan County spans a range of sectors, with the largest shares in education, healthcare, and professional services. Construction also plays a significant role, reflecting ongoing residential development. Table 7 summarizes the distribution of the County's workforce by industry.

[7] U.S. Department of Agriculture, "Census of Agriculture," 2022, https://www.nass.usda.gov/Publications/AgCensus/2022/Full_Report/Volume_1,_Chapter_2_County_Level/Utah/.

Table 7: Employment by Sector[8]

Industry	Percent of Workforce
Educational Services, Healthcare, Social Assistance	22.1%
Professional, Scientific, Management, Admin	13.5%
Construction	11.7%
Manufacturing	10.3%
Retail Trade	9.1%
Agriculture, Forestry, Fishing, Hunting	5.5%
Arts, Entertainment, Recreation, Accommodation, Food Services	6.8%
Finance, Insurance, Real Estate	6.0%
Public Administration	4.2%
Transportation, Warehousing, Utilities	3.6%
Other Services	3.0%

Infrastructure

Electricity and Natural Gas

Electric power in Morgan County is provided by Rocky Mountain Power (a division of PacifiCorp), which operates regional transmission lines and substations throughout northern Utah. The Morgan City substation and smaller distribution facilities support residential, agricultural, and commercial loads across the County. Electrical infrastructure in mountainous terrain is especially vulnerable to wildfires, windstorms, and winter storm damage, leading to periodic outages. Rocky Mountain Power conducts regional load forecasting and grid reinforcement planning in coordination with county growth projections.

Natural gas service is provided by Dominion Energy Utah, which operates high-pressure transmission lines along I-84 and SR-66 and distributes gas to populated centers such as Morgan City, Mountain Green, Enterprise, and Peterson. Newer subdivisions are typically served with natural gas connections, while some rural areas continue to rely on propane or other fuels. Pipeline safety and earthquake resilience are ongoing considerations, as Morgan County is located within the Intermountain Seismic Belt.

Water Infrastructure

Water service in Morgan County is delivered by a combination of municipal systems and local improvement districts. Key providers include Morgan City Water Department, Mountain Green Secondary

[8] U.S. Census Bureau, "2022 American Community Survey 5-Year Estimates," https://data.census.gov/.

Water Improvement District, and several small private or community systems regulated by the Utah Division of Drinking Water.

- **Sources:** Primary water supplies come from groundwater wells, springs, and surface water diversions from the Weber River and its tributaries.
- **Storage:** The County's largest water storage and supply facilities include East Canyon Reservoir (52,000 acre-feet) and Lost Creek Reservoir (22,000 acre-feet), which provide both municipal and agricultural water.
- **Distribution:** Service areas are fragmented, with smaller systems in rural areas often lacking redundancy. This creates vulnerability during drought, wildfire-related contamination events, and system outages.

Water conservation is a countywide priority, as growth pressures increase demand. The Morgan County General Plan (2022) emphasizes the need for secondary water systems, irrigation efficiency improvements, and regional water-sharing agreements with the Weber Basin Water Conservancy District.

Wastewater Infrastructure

Wastewater services are provided by Morgan City Wastewater Department and the Mountain Green Sewer Improvement District, with additional reliance on on-site septic systems in outlying communities.

- **Morgan City Wastewater Treatment Facility:** Treats municipal sewage and discharges to the Weber River under state permits.
- **Mountain Green System:** Serves rapidly growing subdivisions, with expansion needs identified in the 2022 General Plan.
- **Septic Reliance:** In unincorporated areas, widespread use of septic systems creates risks of groundwater contamination, especially near high water tables and flood-prone areas.

Wastewater infrastructure expansion is directly tied to the County's ability to accommodate future residential growth. Hazard events such as flooding, earthquakes, and power outages can cause treatment facility overflows and septic failures.

Road and Highway Network

Transportation infrastructure is anchored by Interstate 84 (I-84), which runs east–west through Morgan County, connecting Ogden and Salt Lake City to the Uinta Mountains and beyond to Wyoming. State highways, including SR-66 (to East Canyon and Henefer) and SR-167 (Trappers Loop), provide vital connections to Davis County and recreation destinations.

County roads are essential for local access, agriculture, and emergency response, but many are narrow, winding, and vulnerable to landslides, rockfall, avalanches, and flooding in canyon corridors. Bridge and culvert capacity has been identified as a critical infrastructure concern in flood hazard areas.

Public Transit and Active Transportation

Morgan County does not operate a fixed-route public transit system. Residents primarily commute by personal vehicle, with carpooling and vanpooling supported by Utah Transit Authority regional services in Weber and Davis Counties. Limited demand-response services exist for seniors and persons with disabilities.

The 2022 General Plan identifies future needs for trail systems, bike lanes, and safe pedestrian routes, especially in Morgan City and Mountain Green, where population growth has outpaced sidewalk and crossing infrastructure.

Stormwater and Flood Control

Stormwater management in Morgan County is a shared responsibility of municipalities, improvement districts, and the County public works department. Current infrastructure includes culverts, roadside ditches, retention basins, and natural drainages. However, many systems are undersized for intense rainfall events or rapid snowmelt.

- **Flood Hazards:** The Weber River and its tributary streams are prone to flooding during spring runoff, while flash flooding occurs in steep canyons during summer thunderstorms.
- **Post-Wildfire Risk:** Burn scars from wildfires (such as the 2020 East Canyon Fire) elevate downstream flash flood and debris flow risk.
- **Future Needs:** Federal Emergency Management Agency floodplain mapping does not fully capture local drainage hazards, requiring updated hydrologic studies to guide land use and subdivision approvals.

The County is considering green infrastructure approaches, such as wetland restoration, floodplain preservation, and detention basins, to supplement traditional hard infrastructure.

Vulnerable Populations

Understanding the needs of vulnerable populations is essential to hazard mitigation planning. In Morgan County, where population growth has been strong, key vulnerability factors include income disparities, an aging population, disability prevalence, and the challenges of rural isolation.

Low-Income Residents

- Approximately 1.7% of Morgan County residents live below the poverty line,[9] which is far lower than Utah's statewide average (8.6%).[10]
- In Morgan City specifically, approximately 2.3% of the population lives below the poverty line.[11]
- Although the proportion is small, low-income households often lack financial resources to invest in preparedness measures (e.g., backup power, defensible space, or flood insurance).
- Many low-income residents rely on older housing stock in Morgan City or rural communities, where limited insulation and outdated systems increase vulnerability to extreme cold, flooding, and seismic hazards.

Elderly Individuals

- Approximately 12.1% of Morgan County's population is 65 and older, representing about 1,520 residents.[12]
  - 65–74 years: 7.2%
  - 75 years and older: 4.9%
- Approximately 13.5% of Morgan City's population is 65 and older, representing about 578 residents.[13]
  - 65–74 years: 10.4%
  - 75 years and older: 3%
- In Morgan City specifically, approximately 2.3% of the population lives below the poverty line.[14]
- Older adults are more susceptible to power outages (due to medical device reliance), extreme winter storms (limited mobility, heating dependence), and health emergencies.
- Rural isolation compounds these risks, as emergency response times can be longer in unincorporated areas.

[9] U.S. Census Bureau, "S1701 Poverty Status in the Past 12 Months," 2023, https://data.census.gov/table?q=morgan+county+utah+poverty&g=050XX00US49029.
[10] U.S. Census Bureau, "S1701 Poverty Status in the Past 12 Months," 2023, https://data.census.gov/table/ACSST5Y2023.S1701?q=utah+poverty&g=050XX00US49029.
[11] U.S. Census Bureau, "S1701 Poverty Status in the Past 12 Months," 2023, https://data.census.gov/table?q=morgan+city+utah+poverty&g=050XX00US49029.
[12] U.S. Census Bureau, "DP05 ACS Demographic and Housing Estimates," 2023, https://data.census.gov/table?q=demographics+morgan+county+utah&g=050XX00US49029.
[13] U.S. Census Bureau, "DP05 ACS Demographic and Housing Estimates," 2023, https://data.census.gov/table?q=demographics+morgan+city+utah&g=050XX00US49029.
[14] U.S. Census Bureau, "S1701 Poverty Status in the Past 12 Months," 2023, https://data.census.gov/table?q=morgan+city+utah+poverty&g=050XX00US49029.

People with Disabilities

- Approximately 8% of Morgan County residents report a disability, representing about 1,012 individuals.[15]
- Approximately 8.3% of Morgan City residents report a disability, representing about 354 individuals.[16]
- Disabilities include mobility impairments, sensory challenges, and cognitive conditions that may hinder evacuation, sheltering, or communication during disasters.
- Many rely on power-dependent equipment (oxygen, mobility aids), making grid reliability a critical resilience factor.

Morgan County scores relatively low on the Social Vulnerability Index (SVI) (0.15–0.25 range) compared to national averages, reflecting high incomes and low poverty (see Table 8). However, rural factors - such as limited transit access, reliance on regional hospitals, and geographic isolation - create vulnerabilities not fully captured by the SVI. Figure 7 shows the overall SVI score for Morgan County by Census tract.

Table 8: Social Vulnerability Index[17]

Population Group	SVI Considerations	Local Description of Vulnerability
Low-Income Residents	Low	Small but at-risk population concentrated in older housing; limited access to recovery resources.
Elderly Individuals (65+)	Moderate	Reliance on heating, medical devices, and rural services increases risks during winter storms and outages.
People with Disabilities	Moderate	Access and mobility challenges during evacuation and sheltering; reliant on powered medical equipment.

[15] U.S. Census Bureau, "S1810 Disability Characteristics," 2023, https://data.census.gov/table?q=disability+morgan+county+utah&g=050XX00US49029.
[16] U.S. Census Bureau, "S1810 Disability Characteristics," 2023, https://data.census.gov/table?q=disability+morgan+city+utah&g=050XX00US49029.
[17] Centers for Disease Control and Prevention/Agency for Toxic Substances and Disease Registry, "CDC/ATSDR Documentation," August 5, 2022, https://stacks.cdc.gov/view/cdc/125626.

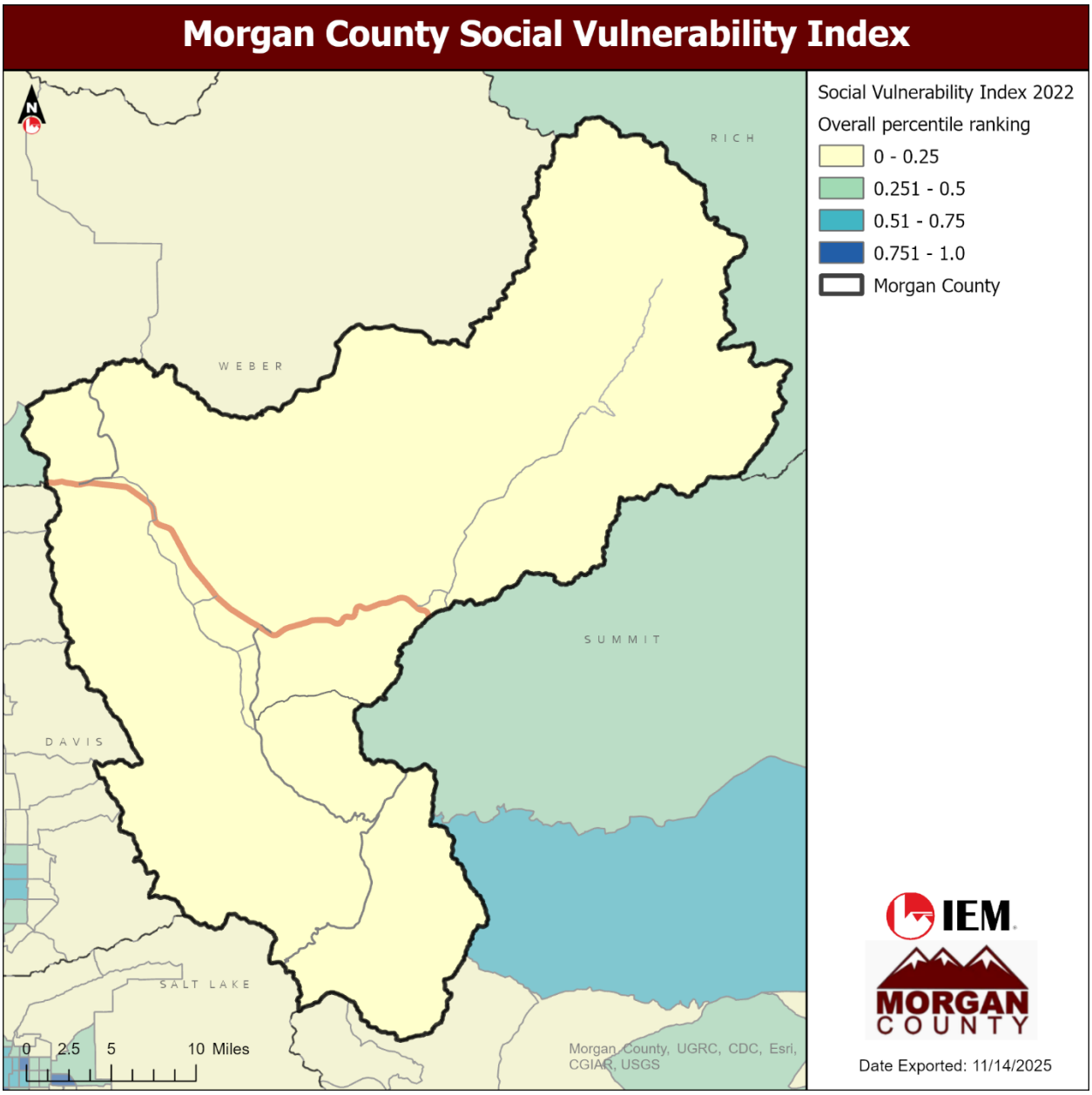


Figure 7: Social Vulnerability Index for Morgan County

Section 3: Risk Assessment and Hazard Profiles

Purpose of the Risk Assessment

The risk assessment process aligns with federal and state regulatory requirements, including the Disaster Mitigation Act of 2000 (DMA 2000), 44 Code of Federal Regulations (CFR) § 201.6, which mandates that local jurisdictions conduct a comprehensive, forward-looking risk assessment to maintain eligibility for Federal Emergency Management Agency (FEMA) Hazard Mitigation Assistance (HMA) grant programs.

From a technical perspective, the risk assessment evaluates hazard probability, severity, previous occurrences vulnerability, and cascading impacts using a multilayered analytical framework that integrates historical disaster data, previous hazard events documented in Morgan County's 2021 Pre-Disaster Mitigation Plan, and climate projections and future risk modeling.

Identifying Hazards

Definition of Hazards

Hazards are defined as natural, technological, or human-caused events that have the potential to cause loss of life, injury, property damage, economic disruption, or environmental degradation.

These hazards are categorized as follows:

- Chronic hazards are long-term, ongoing conditions that gradually affect the county over time, such as drought, soil instability, erosion, and poor air quality.
- Acute hazards are sudden-onset events with short warning times, including flooding, earthquakes, dam failure, landslides, wildfires, and severe weather.

Methodology for Hazard Selection

Hazards for the 2026 Morgan County Local Hazard Mitigation Plan (LHMP) update were determined by reviewing the 2021 Morgan County Pre-Disaster Mitigation Plan, Utah Division of Emergency Management (UDEM) hazard assessments, and input from local stakeholders including municipal leaders, emergency management officials, and public works departments.

Hazards were included or excluded based on historical occurrences, probability, geographic extent, and potential future impacts as identified through FEMA, National Oceanic and Atmospheric Administration (NOAA), and Utah-specific data sources.

The National Risk Index lists 18 hazards; only those applicable to Morgan County were retained for this plan. Each hazard is identified below with an explanation for its inclusion or exclusion.

Table 9: National Risk Index Hazards Inclusion in the 2026 Morgan County LHMP

Hazard	Included	Explanation
Avalanche	Yes	High-elevation terrain in the Wasatch Range, particularly around East Canyon and the upper Weber Basin, experiences seasonal avalanche activity impacting recreation areas and canyon roadways. Morgan City is not within known avalanche areas.
Coastal Flooding	No	Morgan County is landlocked and has no coastal or tidal influence.
Cold Wave	Yes	This hazard is included as Extreme Cold. Extreme cold events are possible during winter, particularly in valley basins where temperature inversions occur; it may impact livestock, energy demand, and vulnerable populations.
Drought	Yes	This is a recurrent hazard with agricultural, water supply, and ecological impacts; Morgan County has experienced multiple drought declarations (2012, 2018, 2021, and 2022).
Earthquake	Yes	The Weber Segment of the Wasatch Fault Zone passes near the county's western boundary; a M6.5–7.0 event could cause significant structural and infrastructure damage.
Hail	Yes	Hail occurs as part of severe convective storms; it is typically small-scale but can damage crops and vehicles.
Heat Wave	No	Morgan County's altitude makes the county less susceptible to extreme heat events relative to other hazards.
Hurricane	No	Inland Utah is outside the influence of tropical cyclones.
Ice Storm	Yes	This hazard is included as part of Snow Storms. Freezing rain and glaze events occasionally occur in mountain valleys, affecting transportation and utilities.
Landslide/ Debris Flow	Yes	Steep canyon terrain and post-fire slopes present ongoing landslide and debris-flow risk, especially in East Canyon and Croydon areas.
Lightning	No	Lightning has not been determined to be major hazard of concern due to lack of prior impacts; related hazards are included as High Wind and Hail.
Riverine/ Flash Flooding	Yes	Weber River, East Canyon Creek, and tributaries are flood-prone; spring snowmelt and heavy summer rainfall create flash-flood potential.
Strong Wind/ Severe Storms	Yes	High winds and thunderstorm gusts frequently impact valley and ridgetop areas, causing power outages and structure damage.

Hazard	Included	Explanation
Tornado	No	This hazard is minimal; only weak, isolated tornadoes have been recorded historically, with minimal impacts. High winds is included in the plan.
Tsunami	No	Utah has no oceanic or large coastal body exposure.
Volcanic Activity	No	There are no active or potentially active volcanic sources within or near Morgan County.
Wildfire	Yes	Much of populated county is in wildfire-urban interface (WUI).
Winter Weather	Yes	Morgan County frequently experiences significant winter weather. This is included as Snowstorms.

Data and Reference Sources

This risk assessment draws on federal, state, and regional plans as well as government and academic data sources. The list below includes some of the main sources used (individual hazard assessments may include additional sources as appropriate).

FEDERAL

- FEMA Local Hazard Mitigation Plan Guidance (44 CFR § 201.6)
- FEMA National Risk Index (2025)
- NOAA National Centers for Environmental Information (NCEI) Storm Events Database
- U.S. Geological Survey National Earthquake Hazards Program and Utah Geological Survey (UGS) Fault Mapping

STATE

- 2019 Utah State Hazard Mitigation Plan
- UGS Geologic Hazards Mapping (2021–2024)
- Utah Division of Emergency Management Hazard Profiles (2023)
- Utah Drought Response and Mitigation Report (2022)

REGIONAL AND LOCAL

- Morgan County Hazard Mitigation Plan (2021, FEMA-approved)
- Morgan County General Plan (2022)
- Weber Basin Water Conservancy District Multi-Hazard Plan (2023)
- Wasatch Front Regional Council resources (2025)

Risk Assessment Matrix and Methodology

This section provides an overview of how the hazards identified for Morgan County were evaluated. A thorough evaluation of existing plans and data sources was conducted, with additional GIS maps added based on existing sources as well as stakeholder input supporting the analyses where appropriate. The subsections that follow summarize data sources and other factors that went into development of hazard profiles and determination of relative risk.

Methodology and Data Sources

The risk assessment for Morgan County utilizes a comprehensive, multilayered approach that integrates historical disaster data, geospatial analysis, probabilistic risk modeling, and climate projections. This methodology ensures that mitigation planning is data-driven, forward-looking, and aligned with evolving hazard conditions specific to the county.

Key data sources included the following:

- Morgan County Hazard Mitigation Plan (2021) hazard profiles, vulnerability assessments, previous event history
- Utah Flood Insurance Study for Morgan County (1990) baseline flood-risk mapping
- UGS geologic hazard mapping and problem-soil assessments
- Utah statewide and regional climate vulnerability assessments, snowmelt/runoff modeling, and drought projections
- National Inventory of Dams and state dam inventories
- Local land-use, housing, and infrastructure data relevant to exposure (Morgan County General Plan, county public works GIS)

Consideration of Future Conditions and Changing Risks

Because of the potential for evolving hazard dynamics, the risk assessment incorporates projections of climate-driven change, population growth, and infrastructure vulnerability in Morgan County. Key future-condition considerations include the following:

- Earlier spring snowmelt and increased runoff volumes in the Weber River basin
- More intense rainfall events causing flash flooding in steep canyon-drainage systems
- Growth in the wildland-urban interface (WUI) and expanding residential development in valley corridors increasing exposure
- Aging infrastructure (dams, stormwater drains, culverts) with increasing maintenance backlog

- Continued expansion of housing and commuting populations placing more people and assets in hazard-prone zones

CPRI Overview

Table 10 shows overall Calculated Priority Risk Index (CPRI) component weighted values for Morgan County developed in alignment with FEMA's Local Mitigation Planning Handbook methodology and using verified local data as follows:

- 2021 Morgan County Hazard Mitigation Plan
- 2023 Morgan County General Plan
- Utah Department of Public Safety, Division of Emergency Management (DEM) Hazard Profiles
- UGS hazard maps and risk summaries
- NOAA and U.S. Drought Monitor data for 2010–2024

Scores were modified based on input from a November 2026 risk assessment stakeholder workshop. Each hazard is scored 1–4 across four weighted factors described in Table 10, with the CPRI table itself as Table 11.

Table 10: CPRI Component Weighted Values

CPRI Component	Description	Weight
Probability	Likelihood of future occurrence	45%
Magnitude/Severity	Potential impact on people, property, and operations	30%
Warning Time	Amount of time to prepare/evacuate	15%
Duration	Length of time event impacts community	10%

Table 11: Countywide CPRI Table for 2026 Morgan County Local Hazard Mitigation Plan[18]

Hazard	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score	Justification Summary
Earthquake	2.5	4	3	3	3.25	Morgan County lies within Weber Segment of Wasatch Fault Zone; potential M6.5–7.0 event could cause severe structural and infrastructure damage.
Radon	4	2	3	4	3.25	EPA Zone 2 (moderate potential, 2–4 pCi/L); elevated indoor radon levels observed in many Morgan County homes, particularly in basements and valley soils; mitigable but persistent long-term exposure risk.
Snow Storms	4	3	2	3	3	Frequent heavy snow events disrupt transportation, utilities, and emergency access; significant impacts on canyon travel routes.
Drought	3.5	3	1	3.5	2.95	Frequent multi-year droughts affect irrigation, livestock, and water supply; economic impacts significant for agriculture and recreation.
Problem Soils	3	2	4	4	2.95	UGS identifies moderate to severe shrink-swell and collapsible soils in valley developments; ongoing structural and infrastructure impacts.
Wildfire	3	3.5	2	2.5	2.9	Increasing frequency near WUI; events like East Canyon Fire (2020) demonstrate vulnerability of canyon and foothill areas.
Flood	3	3	2	2.5	2.75	Frequent spring snowmelt and summer cloudburst flooding; ~120 structures in SFHAs along Weber River and East Canyon Creek; recurring road and crop losses.
Extreme Cold	3	2.5	2	3	2.63	Winter temperatures frequently drop below 0°F; risk to livestock, infrastructure, and vulnerable populations during prolonged cold snaps.
High Wind	3.5	2.5	2	2.5	2.63	Canyon winds exceed 60 mph; impacts include power outages, property damage, and wildfire spread acceleration.
Erosion	3	2	2.5	3	2.55	Common along riverbanks, canyon slopes, and road cuts; worsened by runoff, snowmelt, and post-fire hydrology.
Dam Failure	1	4	3.5	2	2.45	Low-probability, high-consequence hazard; East Canyon and Lost Creek Dams pose catastrophic downstream risk to Morgan City and valley communities.

[18] CPRI: EPA: Calculated Priority Risk Index; U.S. Environmental Protection Agency; M: Magnitude; pCi/L: picocuries per liter; SFHA: Special Flood Hazard Area; UGS: Utah Geological Survey; WUI: Wildland-Urban Interface

Hazard	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score	Justification Summary
Landslide	2	3	2.5	2	2.35	Triggered by steep slopes, snowmelt, and wildfire burn scars; localized damage in canyons, steep road cuts, and post-fire areas.
Avalanche	1.5	2	3	1	1.95	Confined to high-elevation backcountry near East Canyon and Wasatch slopes; limited exposure but high severity for recreationists.
Hail	2.5	2	1	1	1.88	Seasonal thunderstorm hazard; small but frequent hail events damage crops, vehicles, and roofing materials countywide.

Table 12 classifies the hazards listed in the CPRI table (Table 11) by overall risk.

Table 12: 2026 Morgan County Local Hazard Mitigation Risk Level Summary

Risk Level	Hazards Included	Notes
Very High (≥3.0)	Earthquake, Radon	Structural and health impacts widespread and long-term.
High (2.6–2.9)	Snow Storms, Drought, Problem Soils, Wildfire, Flood, Extreme Cold, High Wind	Annual recurrence or chronic impacts across multiple sectors.
Moderate (2.0–2.5)	Erosion, Dam Failure, Landslide, Avalanche, Hail	Localized or low-frequency, high-consequence hazards needing targeted mitigation.
Low (<2.0)	None currently rated Low	N/A – all hazards present measurable impact potential.

Probability of Future Events

Probability describes the likelihood that a hazard event will occur within the planning area during the next five years, consistent with FEMA hazard mitigation planning guidance. The 2026 Morgan County Hazard Mitigation Plan Update determines probability using historical occurrence data, regional hazard records, and known environmental conditions that influence hazard formation.

To ensure consistency across hazard profiles, Table 13 describes the following qualitative probability categories that are used and defined based on approximate recurrence intervals observed in historical records and regional hazard data.

Table 13: Probability of Future Events

Probability Category	Definition	Approximate Recurrence
Highly Likely	Hazard occurs regularly within Morgan County or the surrounding region and is expected to occur multiple times during the next five years.	More than once per year
Likely	Hazard occurs periodically and is expected to occur at least once during the next five years.	Once every 1–5 years
Possible	Hazard occurs infrequently but has been documented historically and could occur within the next five years.	Once every 5–20 years

Probability Category	Definition	Approximate Recurrence
Unlikely	Hazard occurrence is rare in Morgan County but remains theoretically possible.	Greater than 20-year recurrence

These probability categories are based on historical observations, regional hazard records, and professional judgment from local and state agencies including the Utah Division of Emergency Management, Utah Department of Transportation, the National Weather Service, and other technical sources.

Avalanche

Hazard Definition

An avalanche is a rapid downslope movement of snow, ice, and debris that occurs when the strength of the snowpack is exceeded by gravitational forces. Avalanches occur when a mass of snow loses stability and slides downslope under the force of gravity. They can be triggered naturally by new snowfall, rapid warming, or wind loading, or by human activities such as skiing, snowmobiling, or road maintenance. In Morgan County, most avalanches occur in steep mountain terrain with slope angles above 30 degrees, primarily in the Wasatch Back and the upper Weber Canyon. Avalanches are classified by type—loose snow, slab, or wet—and can range in size from small slides capable of burying a person to large events that damage structures, roads, or utilities.

Avalanches vary widely in size and impact—from small, loose-snow slides that pose localized risks to large slab avalanches capable of uprooting trees, damaging infrastructure, and causing fatalities. Key factors influencing avalanche occurrence include slope angle and aspect, elevation, snowpack structure, and recent weather conditions such as wind and temperature gradients.

Morgan County lies within the Wasatch Back region of northern Utah, where steep canyon slopes, heavy winter snowpack, and variable freeze-thaw cycles contribute to avalanche potential. Although the County's population centers—Morgan City and Mountain Green—are located primarily in valley areas, major transportation routes such as Interstate 84, State Route 66, and East Canyon Road traverse or lie below steep terrain where avalanches can occur.

According to the Utah Avalanche Center (UAC) and the Utah Division of Emergency Management, most avalanche activity in Morgan County occurs in the Wasatch Range foothills and upper Weber Canyon, near the County's eastern and southern boundaries. Records from the UAC indicate that the broader Wasatch Back region experiences hundreds of reported avalanches annually.

The UAC monitors snowpack stability and issues daily avalanche forecasts during the winter season. The Utah Department of Transportation (UDOT) and U.S. Forest Service also track avalanche conditions along major transportation corridors and recreation zones.

Geographic Location

Avalanche hazard locations in Morgan County are concentrated along steep mountain slopes and canyon corridors within the upper Weber River Basin and adjacent Wasatch Back terrain. Avalanche-prone zones occur primarily in the eastern and southern portions of the County, where elevations exceed 6,500 feet and slopes approach or exceed 30 degrees—conditions common along the East Canyon, Lost Creek, and Hardscrabble drainages.

The UAC identifies recurrent avalanche paths within the broader Wasatch Range that influence Morgan County's high-elevation areas near the Summit and Weber County boundaries. While Morgan County's populated areas—such as Morgan City, Mountain Green, and Porterville—are located in valley bottoms with limited direct exposure, several transportation routes, recreation areas, and utility corridors traverse or lie immediately below avalanche-prone slopes.

Geographically, avalanche concern areas for Morgan County include the following:

- **East Canyon/Porterville Area:** Steep north- and east-facing slopes above East Canyon Reservoir and East Canyon State Park have documented avalanche activity that can impact access roads and backcountry users.
- **Lost Creek Drainage (Devils Slide Vicinity):** High-relief terrain surrounding Lost Creek Reservoir contains multiple avalanche paths that can affect seasonal recreation access and grazing lands.
- **Hardscrabble Canyon and Upper Weber Canyon:** Road corridors and trail systems in these areas are subject to seasonal avalanche risk, particularly following major snowstorms or rapid thaws.
- **Mountain Green Foothills:** Although residential areas are generally below major slide paths, the steep slopes above Trappers Loop (SR-167) and Snowbasin Resort access routes have historically experienced small to medium natural avalanches that can affect transportation or utility lines.

Avalanches in Utah typically occur between December and April, with peak frequency in January and February, corresponding to periods of heavy snow accumulation and fluctuating temperatures. According to the UAC, the Wasatch and Uinta Mountains average over 700 reported avalanches per year. No fatalities have been recorded within Morgan County in recent decades, but avalanches have periodically caused temporary road closures and slope stabilization work along regional corridors managed by UDOT.

Because avalanche mapping is limited outside of state and U.S. Forest Service study areas, Morgan County uses UAC forecasts, slope and elevation data, and local topography to approximate areas of concern. The County's GIS analysis and coordination with UDOT Region 1, the Utah Division of Emergency Management, and the U.S. Forest Service help identify transportation and recreation zones requiring seasonal monitoring.

The following locations illustrate jurisdictional nuances in avalanche exposure across Morgan County:

- **Mountain Green (Unincorporated):** Avalanche-prone slopes above SR-167 (Trappers Loop) and near Snowbasin Resort represent the County's most active avalanche terrain, with UDOT performing periodic mitigation.
- **Morgan City/Porterville:** Slopes above East Canyon Creek and adjacent recreation areas can produce natural slides capable of blocking secondary roads or trail systems. Impacts to valley infrastructure are low but possible during extreme winters.
- **Other Unincorporated Valleys (e.g., Lost Creek, Hardscrabble):** Narrow canyons with steep relief contain several unmapped avalanche chutes where snow slides could impact recreation trails, access roads, or remote properties during severe winter conditions.

Magnitude and Severity

The magnitude and severity of an avalanche in Morgan County depend on factors such as slope angle, elevation, snowpack depth, snow density, weather patterns, and proximity to transportation routes, recreation areas, and other human activity. Unlike flooding, which develops more gradually, avalanches occur suddenly and can release thousands of tons of snow, ice, and debris within seconds, generating speeds of 60 to 80 miles per hour (mph) and exerting forces sufficient to destroy trees, vehicles, structures, and utility infrastructure in their path.

Avalanche intensity is classified using the Destructive Size Scale (D-scale) developed by the Canadian Avalanche Association and adopted by the UAC:

- **D1 – Small:** Could injure a person but unlikely to bury or kill; typically less than 50 cubic meters of snow.
- **D2 – Medium:** Could bury, injure, or kill a person; damages vehicles or small structures.
- **D3 – Large:** Capable of destroying a wood-frame house or breaking trees; up to 10,000 cubic meters of snow.
- **D4 – Very Large:** Can destroy a railroad car, several structures, or a forested area; more than 100,000 cubic meters.
- **D5 – Extreme:** Largest known avalanches; can destroy major infrastructure and alter terrain; more than 1,000,000 cubic meters.

Avalanches occurring in the Wasatch Range and adjacent Morgan County terrain are typically D2–D3 events, though rare D4 slides have been recorded in nearby Ogden Canyon and upper Weber Canyon. While Morgan County has no recorded avalanche fatalities, historical reports and UAC forecast logs indicate periodic medium-sized natural avalanches in East Canyon, Lost Creek, and Hardscrabble Canyon that have closed roads or threatened recreationists.

The UAC also uses the Danger Rose danger rating system which displays avalanche danger by aspect and elevation.[19] The Danger Rose system is a communication tool for backcountry users to understand risk levels depending on where they are on a slope. The system has two parts: first, is a danger rating system (see Figure 8) and a Danger Rose diagram that uses the danger ratings to convey risk at different aspects and elevations (see Figure 9). In Figure 9 you can see that the danger rating is Considerable on the northwest, north, northeast and east facing slopes in the 8000' to 9500' elevation range as well as above 9500' in elevation. The danger is Moderate on west, southwest, south and southeast facing slopes below 8000', in the 8000' to 9500' elevation range as well as above 9500' in elevation.

[19] Utah Avalanche Center, "Tutorial: Reading the forecast," https://utahavalanchecenter.org/forecast/tutorial

North American Public Avalanche Danger Scale

Avalanche danger is determined by the likelihood, size, and distribution of avalanches.
Safe backcountry travel requires training and experience. You control your risk by choosing when, where, and how you travel.

Danger Level	Travel Advice	Likelihood	Size and Distribution
5 - Extreme	**Extraordinarily dangerous avalanche conditions.** Avoid all avalanche terrain.	Natural and human-triggered avalanches certain.	Very large avalanches in many areas.
4 - High	**Very dangerous avalanche conditions.** Travel in avalanche terrain not recommended.	Natural avalanches likely; human-triggered avalanches very likely.	Large avalanches in many areas; or very large avalanches in specific areas.
3 - Considerable	**Dangerous avalanche conditions.** Careful snowpack evaluation, cautious route-finding, and conservative decision-making essential.	Natural avalanches possible; human-triggered avalanches likely.	Small avalanches in many areas; or large avalanches in specific areas; or very large avalanches in isolated areas.
2 - Moderate	**Heightened avalanche conditions on specific terrain features.** Evaluate snow and terrain carefully; identify features of concern.	Natural avalanches unlikely; human-triggered avalanches possible.	Small avalanches in specific areas; or large avalanches in isolated areas.
1 - Low	**Generally safe avalanche conditions.** Watch for unstable snow on isolated terrain features.	Natural and human-trigged avalanches unlikely.	Small avalanches in isolated areas or extreme terrain.

Figure 8: North American Public Avalanche Danger Scale[20]

[20] Utah Avalanche Center, "Basic Page 13811," https://utahavalanchecenter.org/avalanche-danger-scale

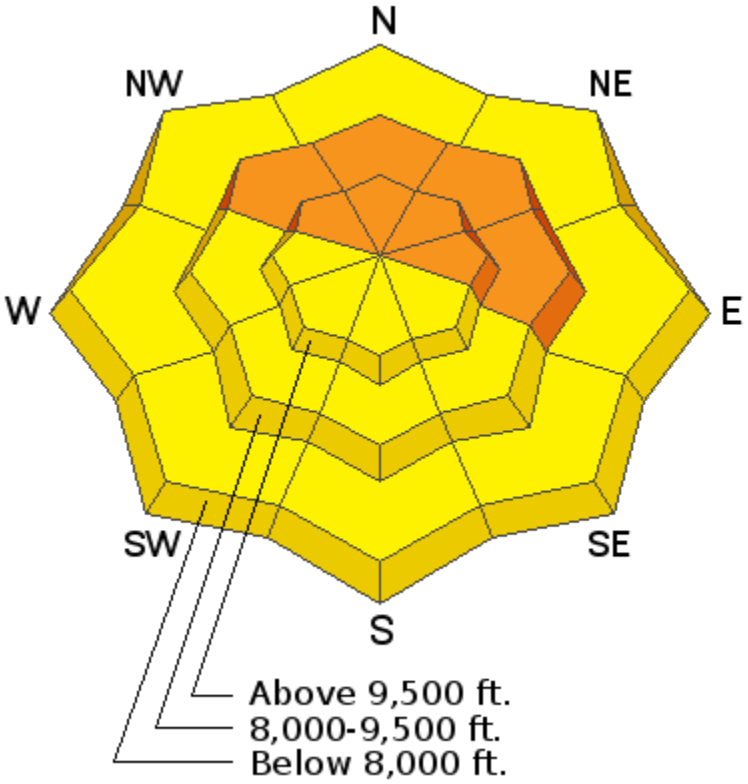


Figure 9: Danger Rose Diagram[21]

MODELED AND OBSERVED AVALANCHE CHARACTERISTICS

Where slope and snowpack analyses are available from the UAC, U.S. Forest Service, or UDOT, typical avalanche characteristics in Morgan County terrain include the following:

- **Runout Distances:** Typical runouts range from 500 to 2,000 feet, depending on slope continuity and snow volume.
- **Flow Velocities:** Velocities typically reach 40 to 80 mph on steep upper slopes, decreasing to 20 to 40 mph in runout zones.
- **Deposition Depths:** A total of 3 to 10 feet of snow may accumulate in confined channels or road cuts, occasionally exceeding 15 feet in deep-drift zones.
- **Snow Density:** Densities range from 200 to 400 kilograms per cubic meter for dry slab avalanches and from 400 to 600 kilograms per cubic meter for wet spring avalanches.

[21] Utah Avalanche Center, "Danger Rose and Location Rose Tutorial," https://utahavalanchecenter.org/danger-rose-and-location-rose-tutorial

Avalanche debris may also include ice, timber, and boulders, increasing destructive power and complicating rescue operations.

CRITICAL FACILITIES AND LIFELINES AT RISK

Populated areas and critical facilities at or near avalanche exposure zones include the following:

- Transportation corridors such as State Route 66, State Route 167 (Trappers Loop), and canyon access roads near East Canyon Reservoir, which may experience temporary closures during or after heavy snow events
- Utility infrastructure, including overhead power lines and communications equipment crossing steep terrain, particularly near Mountain Green and East Canyon
- Recreation facilities at East Canyon State Park and trailheads accessing National Forest lands, which are periodically subject to avalanche warnings and restricted access

Damage or blockage in these corridors could disrupt emergency response, winter recreation, and commuter travel between Morgan County, Weber County, and Summit County.

COMPARISON TO OTHER HAZARDS

Although avalanches are less frequent than other winter weather hazards in Morgan County, their severity can be extreme when they occur. A medium or large avalanche can deliver impact pressures exceeding 30 to 50 tons per square meter, equivalent to wind speeds over 250 mph, and can reach valley floors within seconds. Unlike other hazards, warning time is often measured in minutes, and response depends heavily on weather forecasting, road closure coordination, and public awareness. The UAC provides daily forecasts throughout the winter, and UDOT Region 1 conducts mitigation through avalanche control operations on major state routes.

Historical Occurrences

Morgan County has not experienced a catastrophic avalanche event within its populated areas in recorded history. Historical records from the UAC, Utah Division of Emergency Management, and the National Avalanche Database do not document any avalanche fatalities within Morgan County boundaries as of 2025. However, avalanches are a recurring winter hazard in high-elevation and canyon areas, and the County's proximity to the steep terrain of the Wasatch Back requires ongoing awareness and seasonal monitoring. Figure 10 shows the location of known avalanches, including those that resulted in injuries or fatalities, as recorded by the UAC. Most occurrences near Morgan County have been concentrated in the Wasatch Mountains between Morgan County and neighboring Davis and Weber Counties.

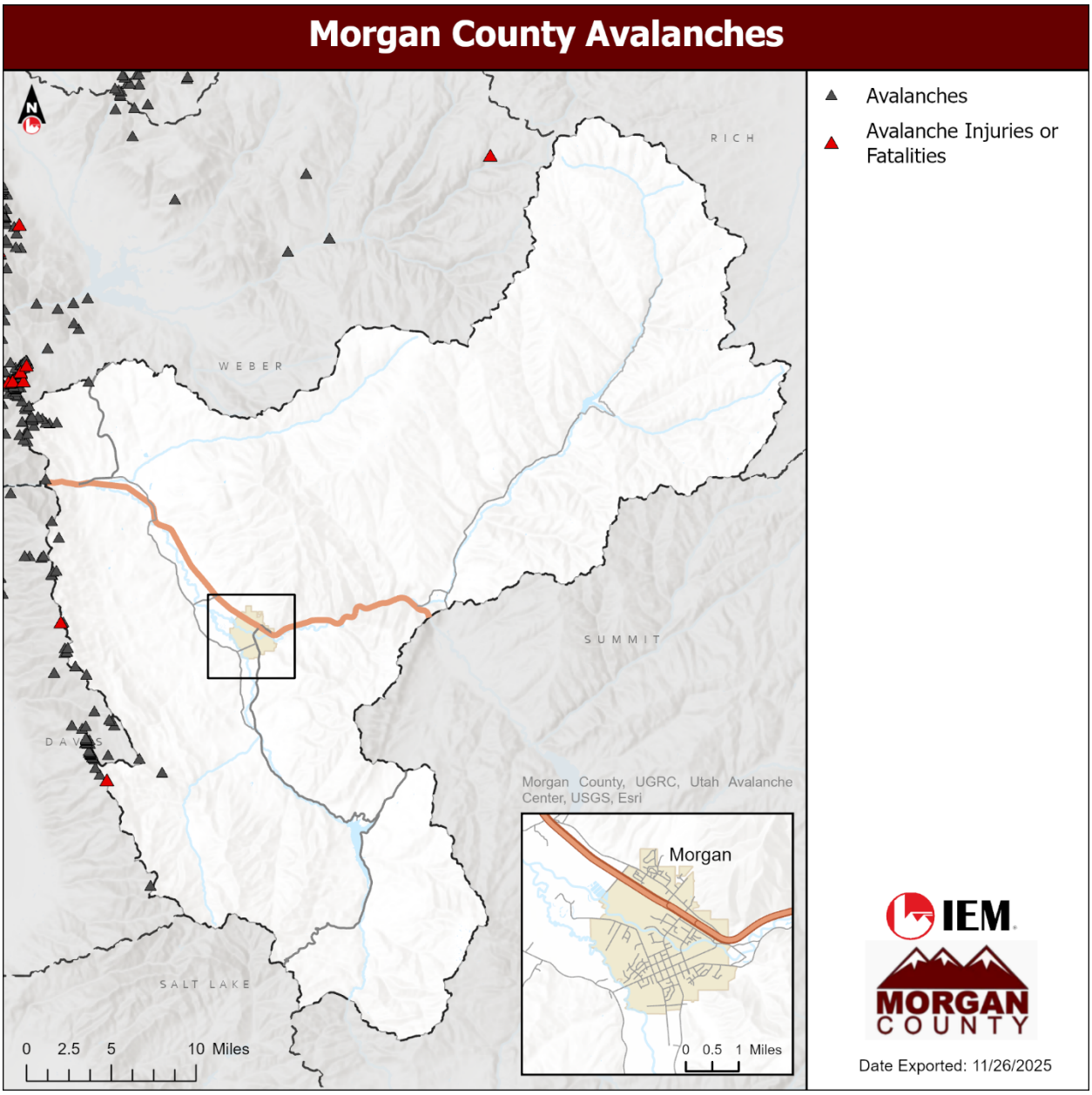


Figure 10: Past Avalanche Incidents Near Morgan County

Although no large, destructive avalanches have directly impacted Morgan City or Mountain Green, several documented avalanche events have affected transportation, recreation, and utilities in and near Morgan County:

- **Trappers Loop Corridor (State Route [SR]-167) – Winters of 2010, 2017, and 2023:** UDOT Region 1 reported multiple snow slides and temporary road closures due to avalanche activity near Snowbasin Resort access routes and steep slopes above Mountain Green. None resulted in injuries, but several events required mechanical snow removal and temporary detours.
- **East Canyon Area – Winter 2019 and 2023:** Natural avalanches occurred on steep north-facing slopes above East Canyon Reservoir following major snowstorms. The Weber Basin Water

Conservancy District reported localized debris and snow deposition near access roads to East Canyon State Park, prompting brief closures and avalanche warnings.

- **Lost Creek Canyon – Winter 2023:** Heavy accumulation and rapid warming in March 2023 triggered several small to moderate avalanches on east-facing slopes near Lost Creek Reservoir. These events deposited 2 to 4 feet of snow and debris over Forest Service access trails and minor utility corridors; no structures were damaged.
- **Hardscrabble Canyon – 2021:** A small, wet-snow avalanche temporarily blocked a local recreation trail near the upper canyon, demonstrating the potential for localized disruptions even outside major transportation corridors.

According to UAC statewide data, the Wasatch Back region experiences over 700 avalanches annually, with an average of three to five fatalities per year, nearly all in backcountry terrain. While no recorded avalanche fatalities have occurred within Morgan County in recent years, avalanches periodically close mountain roads and threaten recreational users in East Canyon State Park and adjacent Forest Service lands. Nearby counties such as Weber and Summit have recorded fatal avalanches within the past decade, underscoring that Morgan County shares similar terrain and meteorological conditions, even if direct impacts have been limited.

STATE AND FEDERAL DISASTER DECLARATIONS

A review of FEMA disaster declaration records and Utah Governor's emergency declarations indicates that Morgan County has not received a federal major disaster declaration or a state disaster declaration specifically attributed to avalanche events since the previous Morgan County Hazard Mitigation Plan update. Avalanche incidents within the County have historically resulted in localized impacts such as temporary road closures, recreation area restrictions, or snow removal operations rather than damages requiring state or federal disaster assistance.

While statewide emergency declarations have occasionally been issued by the State of Utah for severe winter storm conditions affecting multiple counties, these declarations primarily addressed widespread snow accumulation, transportation disruptions, and avalanche mitigation activities conducted by the Utah Department of Transportation and other agencies. Morgan County itself has not been included in a disaster declaration specifically for avalanche impacts since the last plan update.

Probability and Effects of Future Conditions

Based on historical observations and regional avalanche records maintained by the Utah Avalanche Center, the probability of an avalanche occurring within Morgan County's mountainous terrain during the next five years is considered Possible.

Avalanche activity affecting Morgan County most commonly occurs in steep canyon terrain along the Wasatch Back, particularly in the Trappers Loop corridor (SR-167), the East Canyon and Porterville areas, Lost Creek Canyon, and Hardscrabble Canyon. Documented avalanche incidents affecting transportation

corridors or recreation areas have occurred periodically over the past decade, including road closures and snow deposition events reported by the Utah Department of Transportation and the Utah Avalanche Center during the winters of 2010, 2017, 2019, 2021, and 2023. These incidents typically involved small to moderate avalanches that temporarily blocked roads, covered recreation trails, or required mechanical snow removal.

Although avalanche activity occurs regularly in nearby mountain terrain within the Wasatch Range, the probability of a large avalanche directly impacting populated valley areas such as Morgan City or Mountain Green remains low due to the geographic separation between most development areas and steep avalanche start zones. Most avalanche paths occur in higher elevation backcountry areas or above canyon transportation corridors rather than within developed valley floors.

Future avalanche probability may be influenced by several factors including variability in winter snowfall, rain-on-snow events, freeze–thaw cycles that destabilize snowpack layers, and increasing winter recreation activity in backcountry terrain. These factors may increase exposure to avalanche hazards even if the overall frequency of large events remains relatively low.

CURRENT CONDITIONS AND RISK FACTORS

Morgan County lies along the Wasatch Back, where steep canyon walls, deep snow accumulation, and elevations exceeding 6,500 feet create favorable conditions for avalanches between December and April. The UAC identifies recurring avalanche activity in adjacent mountain zones, while several corridors within or near Morgan County are considered moderate- to high-exposure areas, including the following:

- **SR-167 (Trappers Loop):** Frequent natural and storm-triggered avalanches affect slopes above Snowbasin Resort access routes; managed by UDOT Region 1.
- **East Canyon and Porterville Drainages:** Steep, north-facing slopes above East Canyon Reservoir and State Park prone to wet slab slides.
- **Lost Creek Canyon and Hardscrabble Canyon:** Remote areas with high relief and narrow channels where avalanches have periodically closed roads or obstructed trails.
- **Foothills Near Mountain Green:** Steep terrain above residential growth zones where small, localized slides may affect utilities or minor roadways.

While Morgan County does not maintain formal avalanche hazard maps, UAC, the U.S. Forest Service, and UDOT actively monitor conditions and implement forecasting, control operations, and road closures to mitigate hazard exposure along these corridors. Figure 11 shows the current danger ratings for regional areas of Utah maintained by the Utah Avalanche Center.

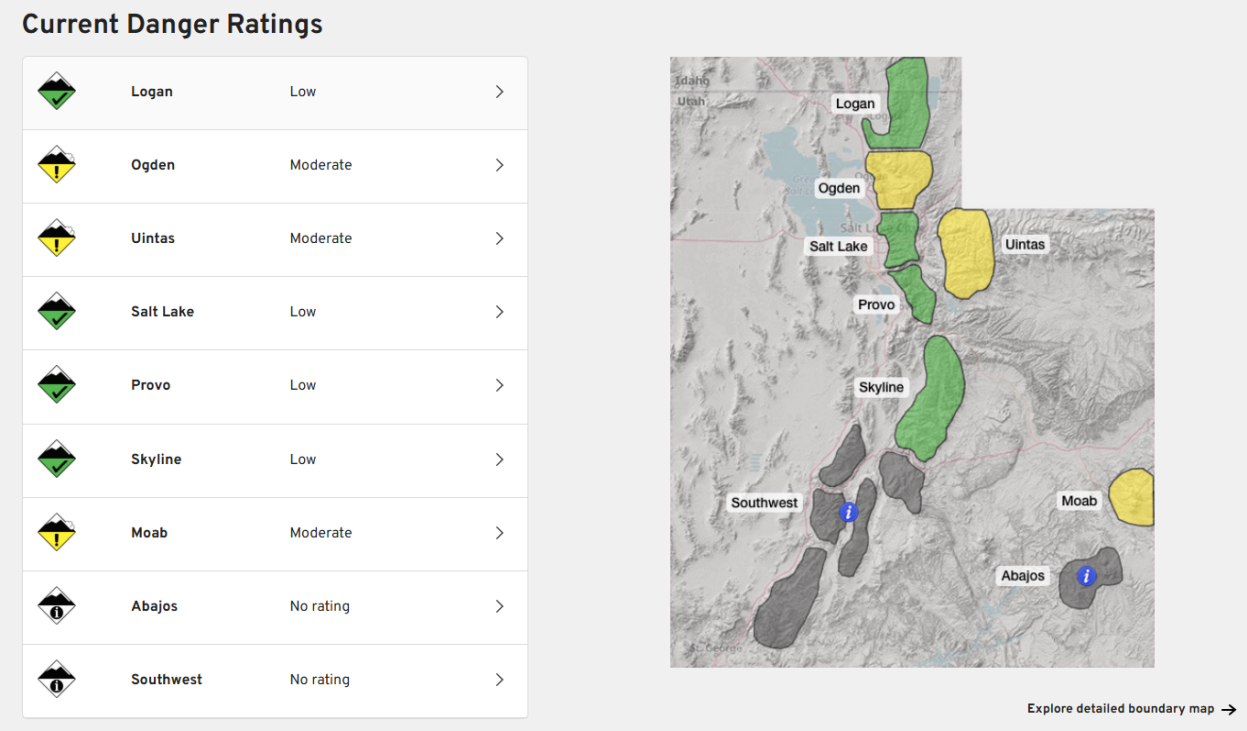


Figure 11: Utah's Current Avalanche Danger Ratings[22]

INFLUENCES ON FUTURE PROBABILITY

Several evolving environmental and social factors are likely to influence avalanche behavior and risk within Morgan County:

- **Climate Variability:** Northern Utah's snowpack is becoming more variable due to warmer winters, more intense snowstorms, and increased rain-on-snow events, all of which destabilize snow layers. The 2022 to 2023 winter season produced record snowfall (800 to 900 inches in some Wasatch locations) and triggered multiple avalanche cycles statewide, leading to temporary road closures near Trappers Loop and East Canyon.
- **Increased Recreation and Mobility:** Expanding skiing, snowmobiling, and backcountry touring activities have increased human exposure in historically low-use avalanche terrain. Proximity to Snowbasin Resort and Powder Mountain brings higher recreation traffic through Morgan County's mountain corridors.
- **Development in Foothill Zones:** Ongoing residential growth in Mountain Green and upper valley slopes introduces potential exposure to smaller, storm-triggered avalanches and secondary snow movements. Utility and communication lines crossing steep terrain may face intermittent snow or debris impacts.

[22] Utah Avalanche Center, "Current Danger Rating" 2025, https://utahavalanchecenter.org/

- **Snowpack and Vegetation Changes:** Drought, wildfire, and vegetation loss can reduce natural slope anchors, increasing slide potential on south- and west-facing slopes. Rapid freeze–thaw cycles and crust layers from warmer winters further reduce snowpack stability.

Collectively, these trends suggest that while overall avalanche frequency may not dramatically increase, the timing, character, and impacts of events will continue to evolve, requiring enhanced monitoring and preparedness. County staff and partners track avalanche activity using UAC forecasts, snow-water equivalent trends, and National Oceanic and Atmospheric Administration/UDOT incident data.

EXPECTED EFFECTS OF A SIGNIFICANT AVALANCHE

If a large or widespread avalanche event were to occur in Morgan County, the following effects would be anticipated:

- **Transportation Impacts:** Immediate road closures could affect SR-167 (Trappers Loop), SR-66 (East Canyon), and local canyon access roads, potentially lasting from several hours to multiple days.
- **Utilities and Lifelines:** Overhead power and communication lines crossing mountain passes could be damaged or rendered temporarily inaccessible.
- **Recreation and Public Access:** Areas such as East Canyon State Park, Lost Creek Reservoir, and Wasatch-Cache National Forest trails could face temporary closures or evacuation during active avalanche cycles.
- **Emergency Response:** Access to affected areas may be delayed due to debris accumulation, poor visibility, or blocked routes in narrow canyons, increasing response times for law enforcement and emergency medical services units.

Dam Failure

Hazard Definition

A dam failure is a structural or operational failure resulting in the uncontrolled release of impounded water. Failure can result from overtopping, internal erosion, seismic shaking, structural deterioration, or operator mistakes. While rare, dam failures can cause significant downstream flooding, endangering life and property.

Dams may fail with little to no warning, and the resulting flood wave can travel downstream with extreme speed and force. Dam failures are especially dangerous because the volume of water released and the speed of inundation can far exceed typical riverine flood conditions. The consequences of dam failure depend on several factors, including the volume of the reservoir, the breach mechanism and size, downstream topography, and proximity to populated areas.

Dams are regulated based on their hazard potential classification, not the physical condition of the dam itself. The Utah Division of Water Rights, Dam Safety Section, classifies dams into the following hazard categories:

- **High Hazard Potential:** Failure may cause loss of human life.
- **Moderate Hazard Potential:** Failure may cause significant damage but no probable loss of life.
- **Low Hazard Potential:** Failure results in minimal damage with no probable loss of life.

Morgan County contains multiple dams of various sizes, most of which are owned by irrigation companies or state or federal entities. The most significant dams for Morgan County's downstream risk profile are East Canyon Dam and Lost Creek Dam (both Bureau of Reclamation Weber Basin Project facilities within the county), and the upstream Echo Dam and Wanship (Rockport) Dam in Summit County, which influence flows into Morgan County. The Utah Division of Water Rights, Dam Safety Section, classifies most of these as High Hazard Potential due to downstream development exposure rather than structural condition.

Geographic Location

Dam failure hazard locations in Morgan County are concentrated where small and medium-sized irrigation, detention, and private/residential impoundments exist in the upper and mid-watersheds feeding the Weber River and its tributaries. The County's dam inventory (state and locally compiled) identifies multiple impoundments whose potential downstream inundation zones intersect populated places, road corridors, and agricultural lands in Mountain Green, Morgan City, Porterville/Portersville, and adjacent unincorporated valleys. The Morgan County and Utah state dam inventories used in recent hazard analyses list specific dams of local concern, including Cobble Creek Dam (Mountain Green), East Canyon (Portersville), Lost Creek (Devils Slide), the Northwest impoundment in Mountain Green, and smaller private/residential features such as Silver Leaf (homes below dam), among others. Echo Dam

(upstream at Echo Reservoir) and Wanship (Rockport) Dam are located in Summit County but lie on the Weber River system upstream of Morgan County and are included because their inundation footprints and operational releases can affect Morgan County. Utah's state dam inventory confirms multiple state-regulated dams in the Mountain Green area, including Northwest Reservoir and Silver Leaf.

Geographically, dams and reservoirs relevant to Morgan County are located in the following areas:

- In the northern and eastern foothills above Mountain Green and the Weber River valley, where small irrigation and detention dams impound headwater drainages that discharge toward Mountain Green and Mountain Green's downstream neighborhoods
- In the East Canyon/Portersville drainage above Morgan City and surrounding agricultural lands, where the East Canyon impoundment(s) can influence flows along East Canyon Creek and the Weber River corridor
- At scattered private/residential sites on smaller tributary drainages (e.g., Silver Leaf, Cobble Creek), where overtopping or breach could send rapid flows into downstream subdivisions, county roads, and irrigation infrastructure

Table 14: Dams in Morgan County

Major Dam	River Basin	Downstream Risk Zone	Hazard Classification	Owner/Agency
East Canyon Dam	East Canyon Creek	East Canyon State Park; SR-65 corridor	High Hazard	Bureau of Reclamation
Lost Creek Dam	Lost Creek	Lost Creek community, SR-167 corridor	High Hazard	Weber Basin Water Conservancy District
Mountain Green Reservoir	Weber River Tributary	Mountain Green	Significant Hazard	Private
Croydon Diversion	Weber River	Croydon, Peterson	Low Hazard	Local Irrigation Co.

Because the state classifies dams by hazard potential (high, moderate, low) based on downstream consequences rather than structural condition, the mapped concern for Morgan County focuses on dams whose failure would put people or critical lifelines at risk (i.e., high-hazard potential or dams located above populated corridors). The local planning team coordinated dam location and consequence information with state and local dam contacts during plan development to ensure the County's hazard profile included dams identified in state inventories and analyses. Figure 12 shows the locations of dams within Morgan County and their hazard rating as reported by Utah Division of Water Resources Dam Safety Section.

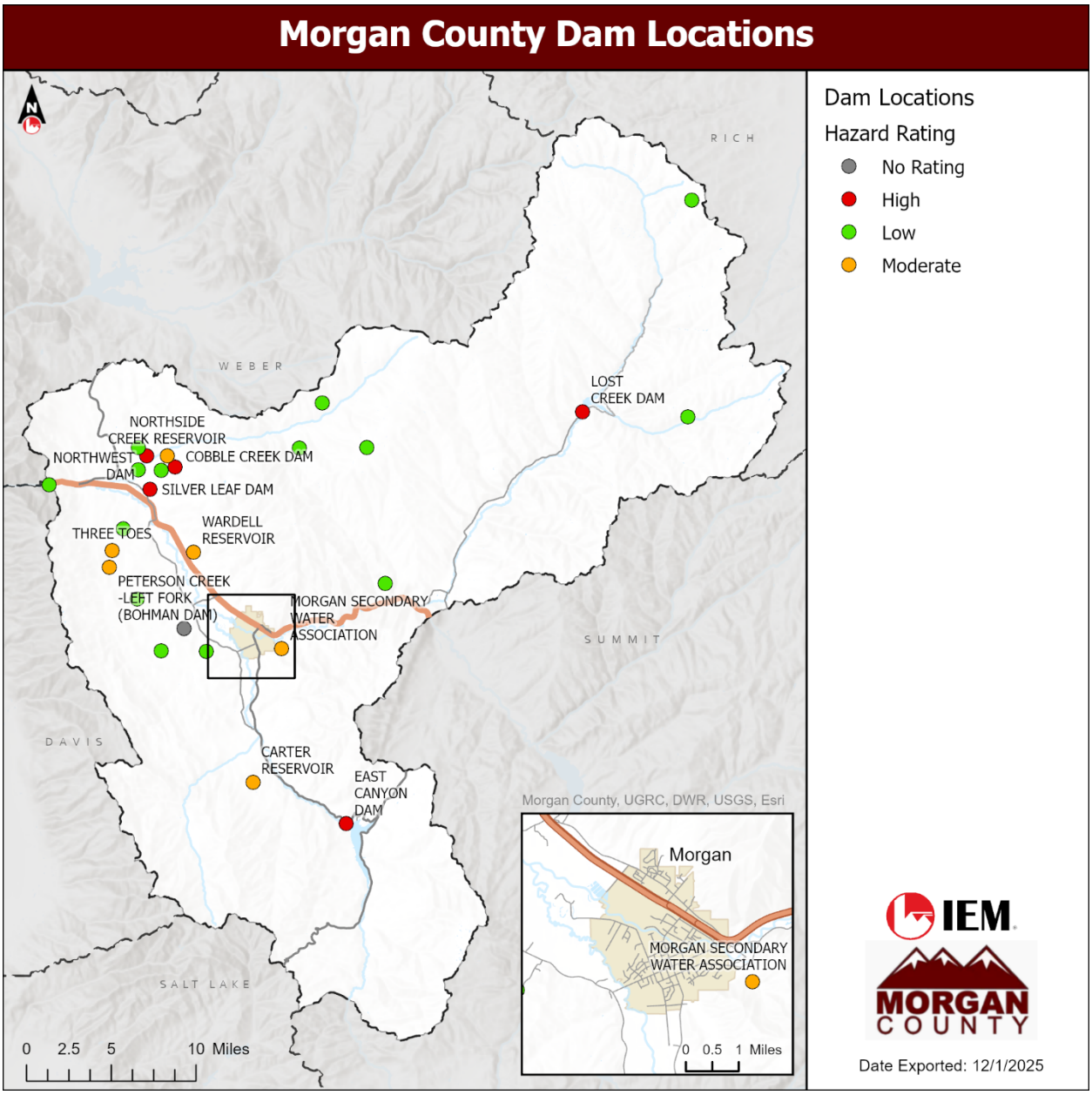


Figure 12: Dam Locations In Morgan County

Where inundation mapping or formal breach studies are not available for a specific dam, the County uses proxy methods to estimate downstream exposure, including topographic flowpath analysis, county parcel and road overlays, and the State's High Hazard Potential Dam tables. FEMA's 2025 Local Mitigation Planning Handbook notes that hazards originating outside the jurisdiction (e.g., an upstream dam) must still be profiled when they may affect the community.

Following is a list of jurisdictional nuances:

- **Mountain Green (Unincorporated):** Multiple small to medium impoundments upstream of residential growth areas create concentrated downstream exposure; several county roads and newer subdivisions lie in potential flowpaths noted in local inventories. State datasets identify Northwest Reservoir near Mountain Green.
- **Morgan City/Portersville:** East Canyon and other impoundments upstream of Morgan City may produce rapid, high-volume flows into the Weber River corridor; agricultural lands and older infrastructure near the river are prioritized as potentially affected areas.
- **Other Unincorporated Valleys (e.g., Porterville, Devils Slide Vicinity):** Privately owned or irrigation district dams in narrow drainages can produce localized, high-velocity flood waves and debris flows with limited warning time.

Magnitude and Severity

The magnitude and severity of a dam failure event in Morgan County depend on the size of the dam, the volume of water impounded, the breach mechanism, downstream topography, and the density of population and infrastructure within the inundation zone. Unlike riverine flooding, a dam failure produces a sudden surge of water with high velocities and potentially devastating impacts on downstream areas.

Modeled inundation depths within mapped high-hazard zones range from 3 to 15 feet near channel centers, with potential flow velocities exceeding 10 feet per second in narrow canyons. Warning times may range from 30 minutes to 2 hours, depending on breach location and flow routing.

Loss-of-life potential is highest immediately downstream of East Canyon and Lost Creek Dams, where recreation use and state park facilities are concentrated. Damage extent would also depend on whether failure occurs during peak storage or snowmelt runoff.

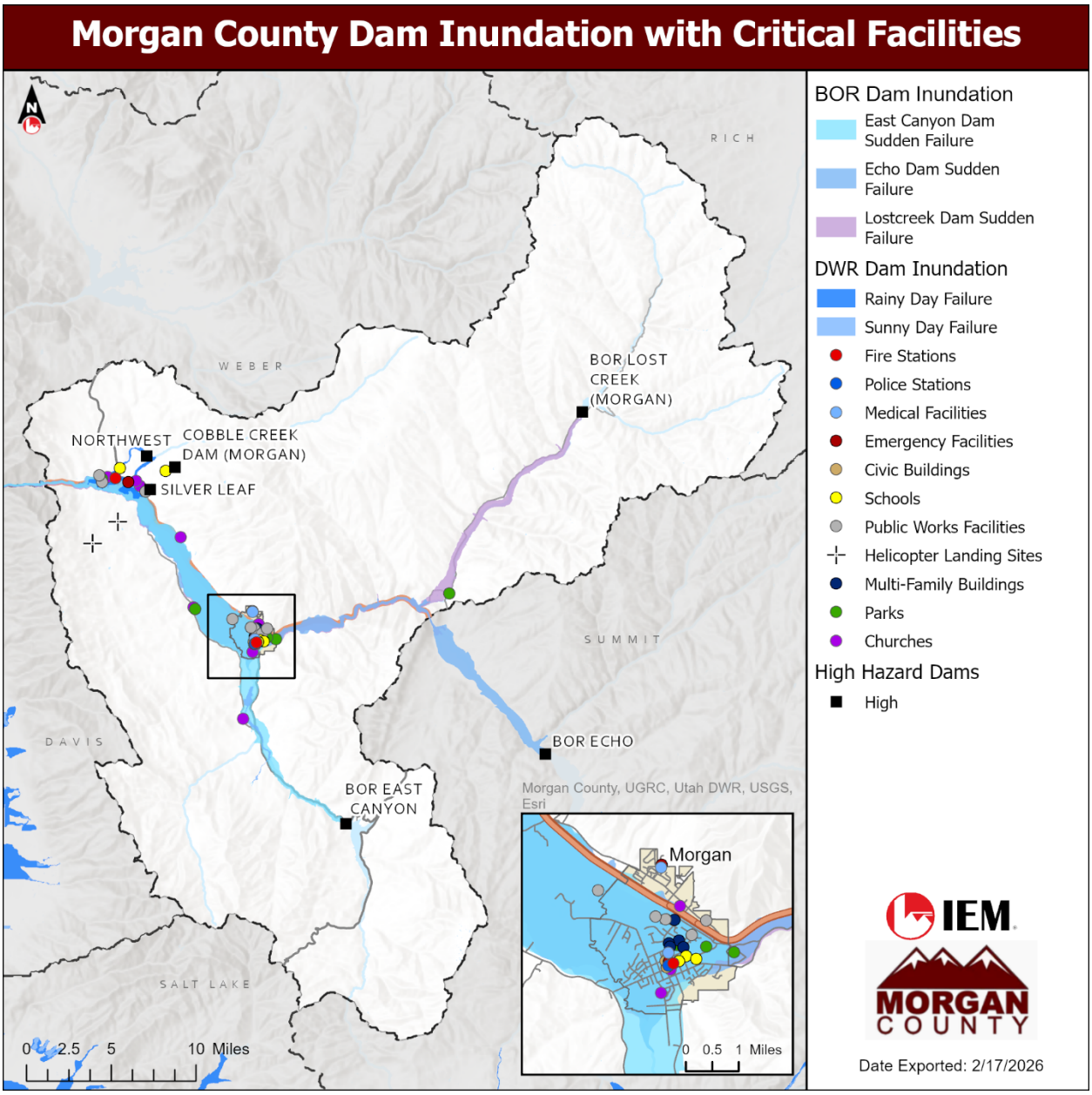


Figure 13: Dam Inundation Areas

MODELED INUNDATION CHARACTERISTICS

Where Emergency Action Plans or state breach analyses are available, inundation maps show the following:

- Peak flow velocities can exceed 10–15 feet per second in narrow canyons and drainage channels immediately below a breached dam.
- Flood depths in primary channels may exceed 5–15 feet in the first mile below a breached high hazard dam.

- Floodwaters may carry significant sediment, debris, and large woody material, increasing destructive power.

These generalized depth and velocity characteristics are derived from published dam breach modeling results, engineering studies, and Emergency Action Plan analyses conducted for high hazard dams in Utah and comparable mountainous watersheds, rather than from the countywide GIS inundation layers themselves. The GIS data depict potential inundation extents only and do not model site-specific flow velocities or depths. The characteristics listed above are provided for planning context to illustrate the potential severity of dam failure impacts where formal breach modeling is available.

CRITICAL FACILITIES AND LIFELINES AT RISK

Populated areas and critical facilities within downstream inundation zones include the following:

- Mountain Green subdivisions and county road corridors downstream of Cobble Creek and other small high hazard dams. I-84, the primary transportation route through Mountain Green, could be affected by flooding following a failure of one of these dams. Mountain Green Fire Department and a sewer treatment plant are both in the potential inundation area for the Northwest Dam.
- Morgan City neighborhoods and agricultural lands along the Weber River and East Canyon Creek downstream of East Canyon Dam. There is significant overlap in the inundation areas of East Canyon, Lost Creek and Echo Dams in Morgan City. Many roads have the potential to be damaged by flooding, including I-84, which provides the primary route through the county. Emergency response facilities, civic buildings, public works facilities, schools, parks, and residences in much of the city southeast of I-84 would be affected by a failure.
- County bridges, State Routes 66 and 167, and utilities (pipelines, powerlines) that cross or parallel stream corridors.

Damage to these facilities would severely disrupt local response, transportation, and utility service. Although dam failures are rare events compared to seasonal flooding, their severity is much higher. A breach of a high hazard potential dam can produce flows and depths far exceeding the 100-year riverine flood, and with much less warning time.

Historical Occurrences

Morgan County has not experienced a catastrophic dam failure event within its boundaries in recorded history. Recent county and state planning documents reviewed do not document any complete structural dam failures in Morgan County. As of 2025, no dam in Morgan County has suffered a complete structural failure resulting in uncontrolled release of its impounded water. However, dam safety remains a critical concern because of the presence of multiple high hazard potential dams whose downstream inundation zones include populated areas, transportation corridors, and agricultural lands.

Although no complete failures have occurred, several events demonstrate the ongoing potential for dam-related hazards:

- **East Canyon Dam – 2011 and 2017:** High runoff conditions and sediment accumulation required controlled releases and emergency spillway operations to maintain safe reservoir levels. No structural issues were reported, but local agencies monitored downstream areas closely for elevated flows along East Canyon Creek and the Weber River corridor.
- **Lost Creek Dam – 2019:** Routine inspections by the Utah Division of Water Rights identified minor seepage and spillway maintenance needs. Repairs were completed without incident; no breach occurred.
- **Cobble Creek and Silver Leaf Dams – Mountain Green, 2022–2023:** Increased precipitation and rapid snowmelt in spring 2023 led to higher-than-usual reservoir levels. County emergency managers coordinated with dam owners to verify spillway capacity and emergency action plan readiness. No failures occurred, but localized high flows were reported downstream in small drainage channels.
- **Spring 2023 East Canyon Reservoir High Inflows:** Following record snowpack, Weber Basin Water Conservancy District officials warned that East Canyon Reservoir (Morgan County) could reach capacity and spill; county officials issued public advisories as inflows exceeded normal outlet capacity[23].

STATE AND FEDERAL DISASTER DECLARATIONS

A review of FEMA disaster declaration records and Utah Governor's emergency declarations indicates that Morgan County has not received a federal major disaster declaration or a state disaster declaration specifically attributed to dam failure since the previous Morgan County Hazard Mitigation Plan update. While high runoff and reservoir management events—such as those observed during the 2011, 2017, and 2023 spring runoff seasons—have required monitoring, controlled releases, or coordination with dam operators, none of these incidents resulted in structural dam failure or disaster declarations for Morgan County.

Although statewide emergency declarations have occasionally been issued by the State of Utah for severe weather conditions affecting multiple counties, Morgan County has not been included in a state or federal disaster declaration specifically related to dam failure since the last plan update.

Probability and Effects of Future Conditions

The Based on historical records and dam safety monitoring data, the probability of a catastrophic dam failure affecting Morgan County within the next five years is considered Unlikely. Under the probability framework used in this plan, Unlikely indicates that the hazard is rare and has not occurred in the planning area in recorded history but remains possible due to the presence of dams and potential triggering factors such as extreme runoff, seismic activity, or infrastructure failure.

Morgan County has not experienced a complete structural dam failure within its boundaries in recorded history. Routine inspections conducted by the Utah Division of Water Rights Dam Safety Section, along

[23] Utah Division of Water Resources, Spring Runoff Report, 2023, https://water.utah.gov/.

with maintenance activities performed by dam owners such as the Bureau of Reclamation and Weber Basin Water Conservancy District, help reduce the likelihood of structural failure. However, the presence of several high hazard potential dams - including East Canyon Dam and Lost Creek Dam - and smaller impoundments upstream of populated areas means that a dam failure, while rare, could produce severe downstream flooding impacts if it were to occur. According to the Utah Division of Water Resources, nearly 50% of the state's dams were constructed before 1975, using engineering standards that are now considered outdated, raising concerns about their long-term reliability[24].

In addition to aging infrastructure, there is a significant increase in downstream development, particularly in areas like Mountain Green and Morgan City. The growth in both residential and commercial sectors elevates the risk of population exposure to potential inundation zones. As more people move into these areas, the stakes for dam safety continue to rise.

Seismic risk adds compounding exposure. The Weber Segment of the Wasatch Fault runs near the county's western boundary, and a large earthquake could produce ground shaking capable of damaging embankment dams or appurtenant structures. The Utah Geological Survey estimates a 10%–12% probability of an M 6.75 or larger event along the Weber Segment within 50 years.

Climate variability also plays a crucial role in shaping the challenges faced by these dams. Recent observations indicate that snowpack trends in northern Utah are marked by increasing variability in both the timing and magnitude of spring runoff. The Natural Resources Conservation Service (NRCS) reports that the snowpack in the Weber River Basin, which includes parts of Morgan County, has exhibited significant fluctuations, with peak snowpack levels varying by as much as 50% year over year over the past decade[25].

Events that combine rain and snow, which were once considered rare, are now becoming more frequent. Such occurrences can lead to rapid reservoir filling that exceeds design expectations, placing significant stress on spillways and heightening the risk of overtopping. The spring runoff emergency of 2023 serves as a stark example of this phenomenon. Public reports indicated that East Canyon Reservoir was nearing spill capacity while inflows exceeded typical outlet capabilities, with inflows recorded at 1,500 cubic feet per second (cfs) during peak conditions, well above the outlet capacity of approximately 1,000 cfs.[26] This situation highlighted the vulnerabilities of narrow mountain reservoirs in Morgan County, demonstrating the urgent need for improved management strategies.

Lastly, sedimentation poses an ongoing challenge for many smaller reservoirs in the region. The Utah Division of Water Resources estimates that sediment accumulation in some reservoirs has reduced their effective storage capacity by as much as 30% over the last 20 years. This reduction can compromise spillway performance, and as capacity diminishes, the likelihood of overtopping during high inflow events increases, further exacerbating the risks associated with dam safety.

[24] Utah Division of Water Resources, "Dam Safety Program", 2021, https://water.utah.gov/).
[25] Natural Resources Conservation Service (NRCS), "Snowpack and Water Supply Forecast", 2023, https://www.nrcs.usda.gov/).
[26] Utah Division of Water Resources, Spring Runoff Report, 2023, https://water.utah.gov/.

Table 15: Summary of Future Dam Failure Risk Factors

Factor	Effect on Dam Failure Risk
Aging Infrastructure	There is increased potential for embankment seepage, spillway erosion, and structural deterioration, especially for dams over 50 years old.
Increased Downstream Development	There is greater population, property, and critical infrastructure exposure within inundation zones in Mountain Green, Morgan City, and Porterville.
Climate Variability	Higher likelihood of simultaneous high inflow and storage conditions from rain-on-snow events and variable snowpack would stress spillways and raise overtopping potential.
Sedimentation	Reduced storage capacity in smaller reservoirs increases risk of overtopping during high inflow events.
Upstream Dam Influences	Failure or emergency releases from Echo Dam or Wanship (Rockport) Dam in Summit County could contribute to downstream flooding impacts in Morgan County.

Drought

Hazard Definition

Drought is defined as a deficiency in moisture that results in adverse impacts on people, animals, or vegetation over a sizable area. It is characterized by the absence of precipitation for an extended period, which can lead to significant ecological, agricultural, and socioeconomic impacts. Federal drought guidance (including U.S. Department of Agriculture [USDA] and National Oceanic and Atmospheric Administration sources) defines meteorological drought as an increase in dry weather conditions from reduced precipitation and increased temperatures that result in hydrological drought, agricultural drought, socioeconomic drought, and ecological drought (see Figure 14):[27]

- **Meteorological drought** happens when an area experiences a prolonged period of unusually dry weather.
- **Hydrological drought** refers to reduced water levels in rivers, reservoirs, and groundwater, often following months of meteorological drought.
- **Agricultural drought** occurs when there isn't enough soil moisture to support crops or livestock.
- **Socioeconomic drought** links the effects of drought to the supply and demand of goods and services, such as water for energy production or food availability.
- **Ecological drought** refers to ecosystem effects of drought, which can increase ecosystem vulnerability to other disturbances and affect a variety of plants and animals in forests and rangelands.

In Morgan County, drought conditions may also exacerbate secondary hazards such as increased wildfire potential, soil subsidence and erosion, water quality degradation, and agricultural losses that affect both local economies and regional food supply chains.[28]

[27] U.S. Department of Agriculture, Forest Service, "Drought," 2025, https://www.fs.usda.gov/managing-land/sc/drought.
[28] Utah Division of Water Resources (UDWR), "Water Resources Plan," 2021, https://water.utah.gov/2021waterplan/

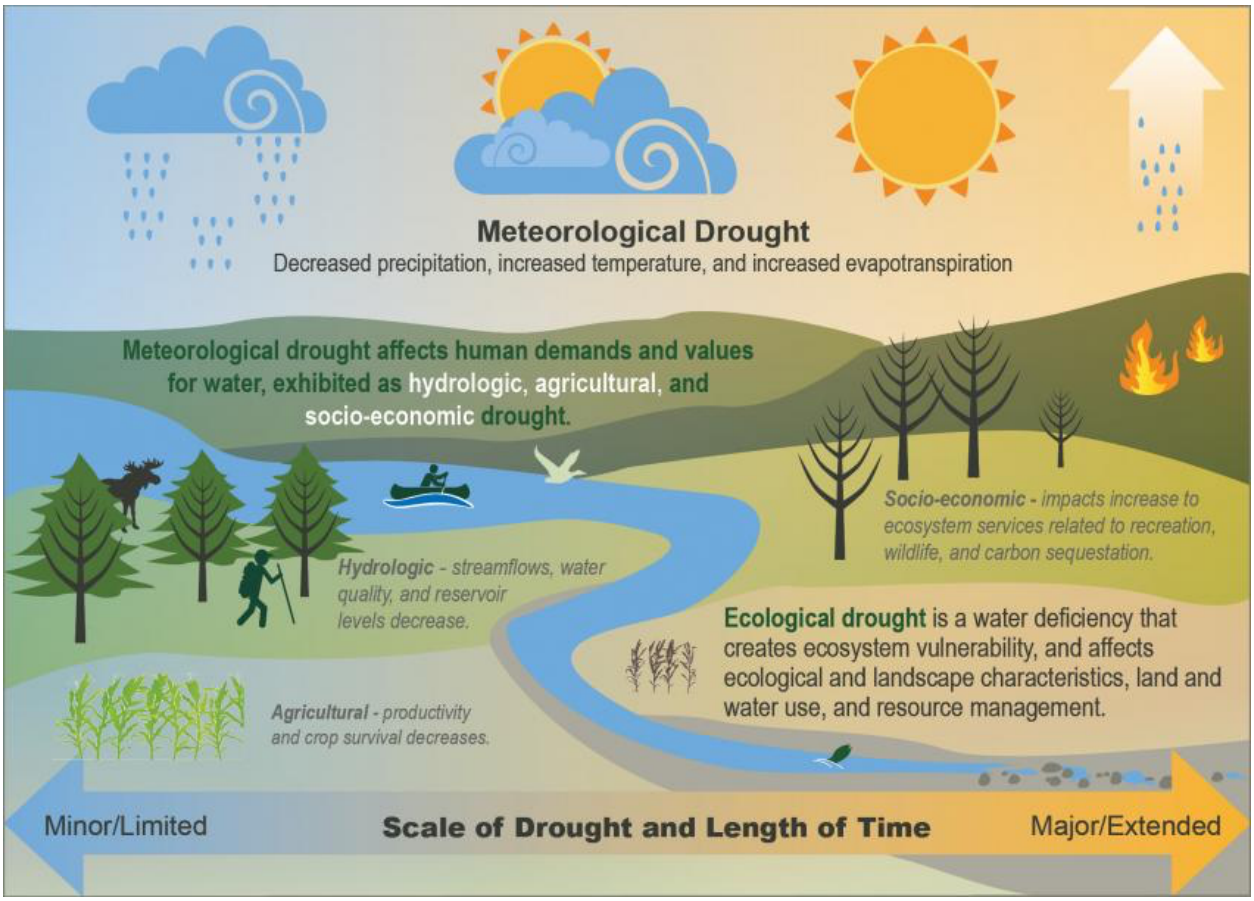


Figure 14: Impacts of Meteorological Drought[29]

Geographic Location

Utah's arid climate makes drought conditions common and expected events. Since 2002, various parts of the state have faced drought conditions due to its vast geographic area and diverse climate. As one of the driest states in the nation, Utah must address concerns about the availability and demand for water supply driven by its rapidly growing population. Drought not only impacts water levels, but it also redefines ecosystems, economies, communities, and natural wonders across the state.[30]

Utah's snowpack provides over 95% of its developed water supply, resulting from slowly melting snow that releases water each spring to feed rivers, lakes, and reservoirs. In years when the snowpack is low, this water resource runs dry, affecting everything downstream.[31] Utah's reservoirs serve as a critical buffer, storing water during wet years to carry the state through dry years. Extended drought conditions can

[29] U.S. Forest Service, "Drought," 2025, https://www.fs.usda.gov/managing-land/sc/drought.
[30] Utah Department of Natural Resources, "Drought in Utah, More than a Water Supply Issue," 2025, https://naturalresources.utah.gov/dnr-newsfeed/drought-in-utah-more-than-a-water-supply-issue/.
[31] Utah Department of Natural Resources, "Drought in Utah, More than a Water Supply Issue," 2025, https://naturalresources.utah.gov/dnr-newsfeed/drought-in-utah-more-than-a-water-supply-issue/.

reduce reservoir levels dramatically, limiting the availability of water for homes, farms, and the environment.[32]

Morgan County lies within two Utah Climate Divisions (Divisions 3 and 5), both characterized by strong reliance on winter snowpack for surface and reservoir recharge. Countywide, public and private water supplies depend primarily on surface water from the Weber River and its tributaries, supplemented by groundwater wells in valley-fill aquifers. The East Canyon, Lost Creek, Echo, and Rockport reservoirs provide key regional storage and supply redundancy (see Table 16). While drought affects all communities in Morgan County, relative vulnerability varies by system configuration, source type, and available interties (connections between water systems for backup or shared supply); these distinctions are detailed in each jurisdiction's annex.

Table 16: Morgan County Water Supply Overview

Primary Water Source Type	Major Systems	Storage/Conveyance	Key Reservoir Influence
Surface water	East Canyon, Lost Creek, Weber River intakes	Pipelines and treatment plants	East Canyon, Lost Creek
Groundwater (wells)	Valley-fill wells (Morgan Valley, Mountain Green)	Distribution systems	Recharge via Weber River and alluvium
Secondary irrigation	Weber Basin Water Conservancy District, private ditch systems	Canals, pressurized irrigation	Reservoir-fed

Magnitude and Severity

The United States Drought Monitor provides a map that identifies areas of drought and classifies them by intensity. Category D1 is the least intense level and D4 the most intense (see Figure 15). Drought is defined as a moisture deficit severe enough to cause social, environmental, or economic effects. Category D0 areas are not technically in drought but are experiencing abnormally dry conditions that could lead to drought or indicate recovery from drought without full return to normal.

In Morgan County, Drought Monitor categories typically trigger local actions ranging from voluntary conservation measures (D1–D2) to formal restrictions and emergency water purchases (D3–D4). Secondary water providers may curtail irrigation seasons when reservoir storage falls below approximately 60% of normal. Figure 16 shows the extent of recent drought conditions in Morgan County and across Utah. Figure 17 shows the drought impact on Morgan County agricultural products as of November 2025.

[32] Utah Department of Natural Resources, "Drought in Utah, More than a Water Supply Issue," 2025, https://naturalresources.utah.gov/dnr-newsfeed/drought-in-utah-more-than-a-water-supply-issue/.

			Ranges				
Category	Description	Possible Impacts	Palmer Drought Severity Index (PDSI)	CPC Soil Moisture Model (Percentiles)	USGS Weekly Streamflow (Percentiles)	Standardized Precipitation Index (SPI)	Objective Drought Indicator Blends (Percentiles)
D0	Abnormally Dry	Going into drought: ▪ short-term dryness slowing planting, growth of crops or pastures Coming out of drought: ▪ some lingering water deficits ▪ pastures or crops not fully recovered	-1.0 to -1.9	21 to 30	21 to 30	-0.5 to -0.7	21 to 30
D1	Moderate Drought	▪ Some damage to crops, pastures ▪ Streams, reservoirs, or wells low, some water shortages developing or imminent ▪ Voluntary water-use restrictions requested	-2.0 to -2.9	11 to 20	11 to 20	-0.8 to -1.2	11 to 20
D2	Severe Drought	▪ Crop or pasture losses likely ▪ Water shortages common ▪ Water restrictions imposed	-3.0 to -3.9	6 to 10	6 to 10	-1.3 to -1.5	6 to 10
D3	Extreme Drought	▪ Major crop/pasture losses ▪ Widespread water shortages or restrictions	-4.0 to -4.9	3 to 5	3 to 5	-1.6 to -1.9	3 to 5
D4	Exceptional Drought	▪ Exceptional and widespread crop/pasture losses ▪ Shortages of water in reservoirs, streams, and wells creating water emergencies	-5.0 or less	0 to 2	0 to 2	-2.0 or less	0 to 2

Figure 15: Drought Classification[33]

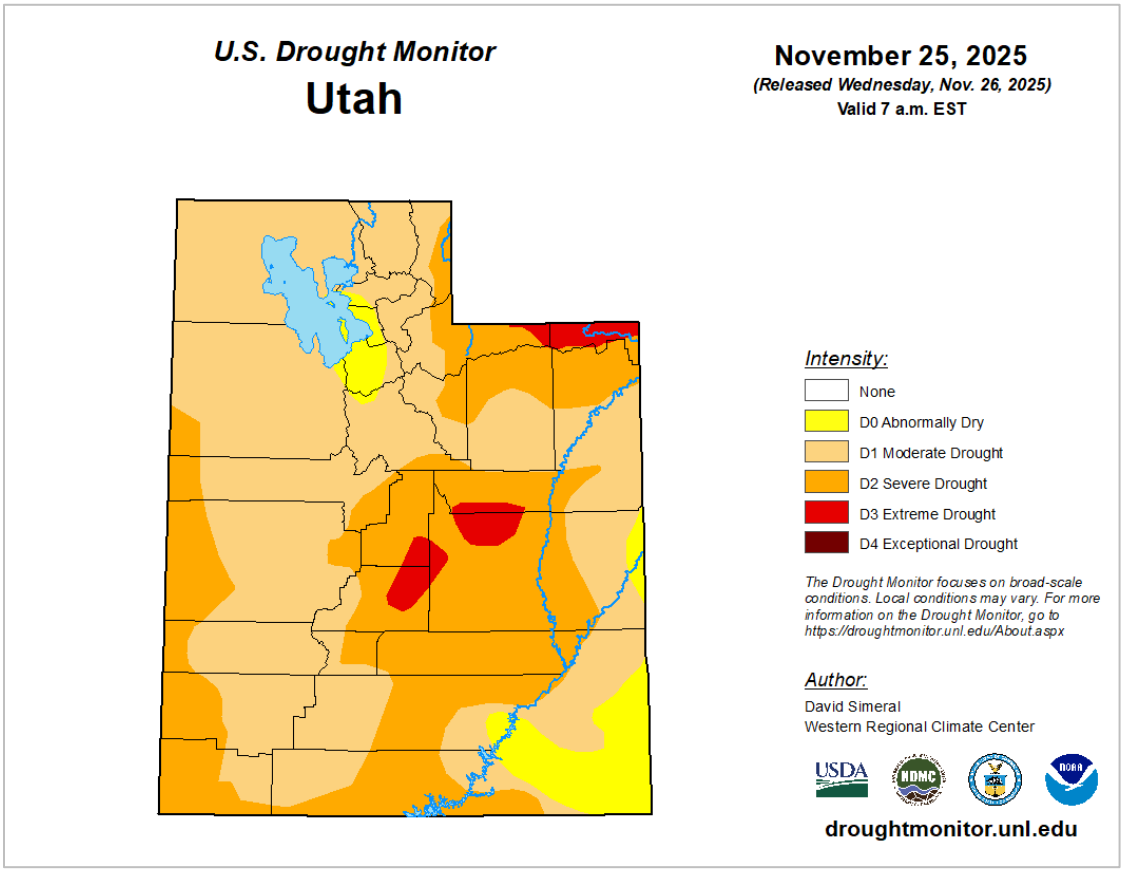


Figure 16: Map of Drought Monitor Conditions in Utah, November 25, 2025

[33] U.S. Drought Monitor, 2025, https://droughtmonitor.unl.edu/About/AbouttheData/DroughtClassification.aspx.

Figure 17: Drought Impacts on Agriculture in Morgan County[34]

The Palmer Drought Severity Index (PDSI) developed by Wayne Palmer in 1965, measures drought severity using temperature, precipitation, and soil moisture (see Table 17). The PDSI has become the "semi-official" drought index as it is standardized across various climates. The index uses zero as normal and assigns a number between +6 and −6, with dry periods having negative numbers and wet periods expressed using positive numbers.[35]

Table 17: Palmer Drought Severity Index Classification and Range[36]

Range	Palmer-Classification
4.0 or more	Extremely Wet
3.0 to 3.99	Very Wet
2.0 to 2.99	Moderately Wet
1.0 to 1.99	Slightly Wet
0.5 to 0.99	Incipient Wet Spell
0.49 to −0.49	Near Normal
−0.5 to −0.99	Incipient Dry Spell
−1.0 to −1.99	Mild Drought
−2.0 to −2.99	Moderate Drought
−3.0 to −3.99	Severe Drought
−4.0 or less	Extreme Drought

Historical Occurrences

Between 2000 and 2025, Morgan County has experienced drought conditions during roughly 60% of years, with at least three extended multi-year events (2002–2004, 2012–2013, 2021–2022).

[34] U.S. Drought Monitor, "Drought Impacts on Agriculture in Morgan County, Utah," 2025, https://www.drought.gov/states/utah/county/Morgan.
[35] National Integrated Drought Information System, "Palmer Severity Drought Index," 2025, https://www.drought.gov/data-maps-tools/us-gridded-palmer-drought-severity-index-pdsi-gridmet.
[36] U.S. Drought Monitor, 2025, https://droughtmonitor.unl.edu/About/AbouttheData/DroughtClassification.aspx.

Table 18: Significant Drought Events in Morgan County (2000–2025)

Year(s)	Peak Intensity Level[37]	Key Impacts/Actions	Notes
2002–2004	D4 (Exceptional)	Severe irrigation curtailments; secondary water shutoffs; low reservoir levels	Governor Emergency Declaration
2012–2013	D3	Reduced irrigation allotments; voluntary residential restrictions	USDA Disaster Declaration
2021–2022	D4	Record low storage; mandatory watering restrictions; emergency drought declaration	Active State Declaration
2024	D2	Early onset of summer restrictions; reservoir below 60%	Observed

Based on the Federal Emergency Management Agency (FEMA) Disaster Declarations Database, Morgan County has received no designation for drought disaster declarations since the last plan update. This reflects FEMA's statutory limitations for drought assistance and differs from agricultural disaster declarations. However, Governor Spencer Cox issued an Executive Order declaring a state of emergency due to drought on March 17, 2021, and again on April 21, 2022, due to drought conditions affecting the entire state.[38] There have been 14 USDA disaster declarations due to drought recorded for Morgan County since 2019.[39]

The most severe drought period in recorded history for the North Central and Northern Mountains Regions occurred in 1934 at the height of the Great Depression and during the same drought period (1930–1936) that caused the "Dust Bowl" on the Great Plains. The longest drought period varied from 11 years for the North Central Region (1953–1963), and 6 years for the Northern Mountains (twice: 1900–1905 and 1987–1992).[40] In 2018, a severe drought caused virtually all of the state to be in a moderate drought, with many areas in extreme drought. This drought peaked in September 2018 and reached −6.16 on the Palmer Drought Severity Index scale statewide.

Figure 18 shows a time series of drought conditions for Morgan County from 2001 to 2025. Severe to exceptional drought conditions occurred from 2003 to 2005 and from 2021 to 2023.[41]

[37] "Peak intensity level" refers to the highest drought category reached, based on the U.S. Drought Monitor.
[38] Morganutah.gov, "Gov. Cox Issues Drought Executive Order," 2021, https://www.morganutah.gov/media/4861
[39] U.S. Department of Agriculture, 2025, Disaster Designation Information | Farm Service Agency
[40] Utah Division of Water Resources, "Drought in Utah: Learning from the Past – Preparing for the Future," 2007, https://water.utah.gov/wp-content/uploads/2020/06/Drought-Report-Final-VersionBinder2.pdf
[41] U.S. Drought Monitor, "Morgan County Drought Conditions Time Series 2001-2025," https://www.drought.gov/states/utah/county/Morgan

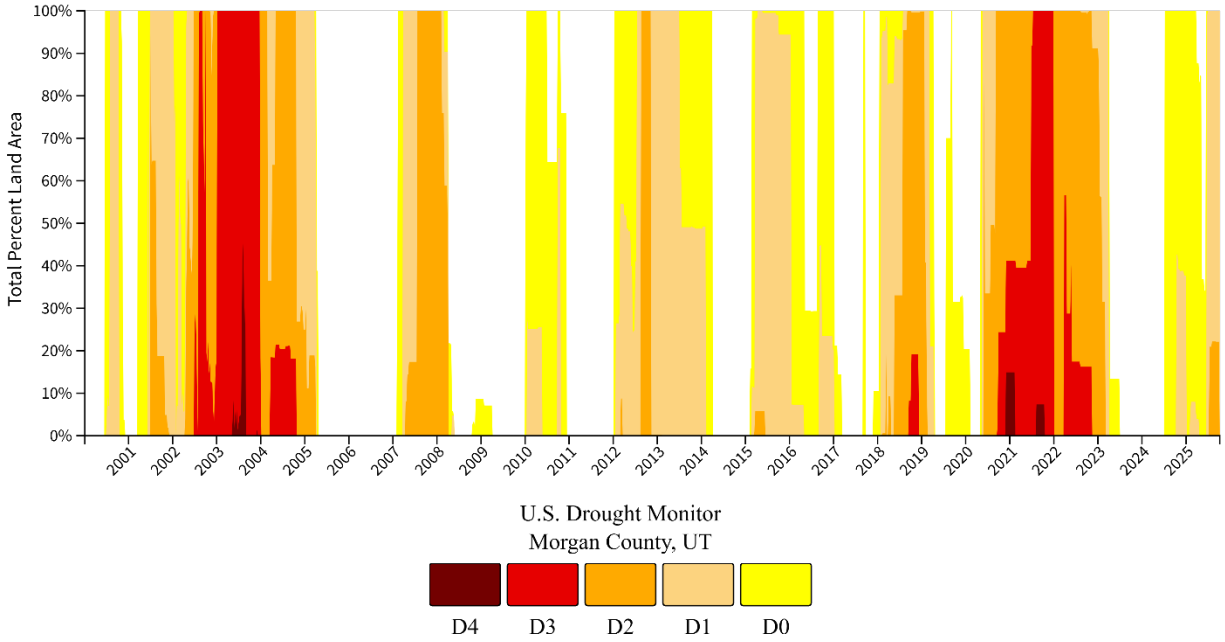


Figure 18: U.S. Drought Monitor Time Series, Morgan County Drought Conditions, 2001–2025[42]

Figure 19 shows forecasts for total precipitation (left image) and abnormal precipitation (right image) for September to November 2025 in the Western United States. The map legend indicates that Utah's total precipitation for the observed time frame was between 0 and 5 inches, and abnormal precipitation ranged from 0 to −0.5 inches.[43]

[42] U.S. Drought Monitor, "Morgan County Drought Conditions Time Series 2001-2025," https://www.drought.gov/states/utah/county/Morgan

[43] Bureau of Reclamation, Utah State University, Utah Climate Center, 2025, Seasonal Drought Forecast (usu.edu)

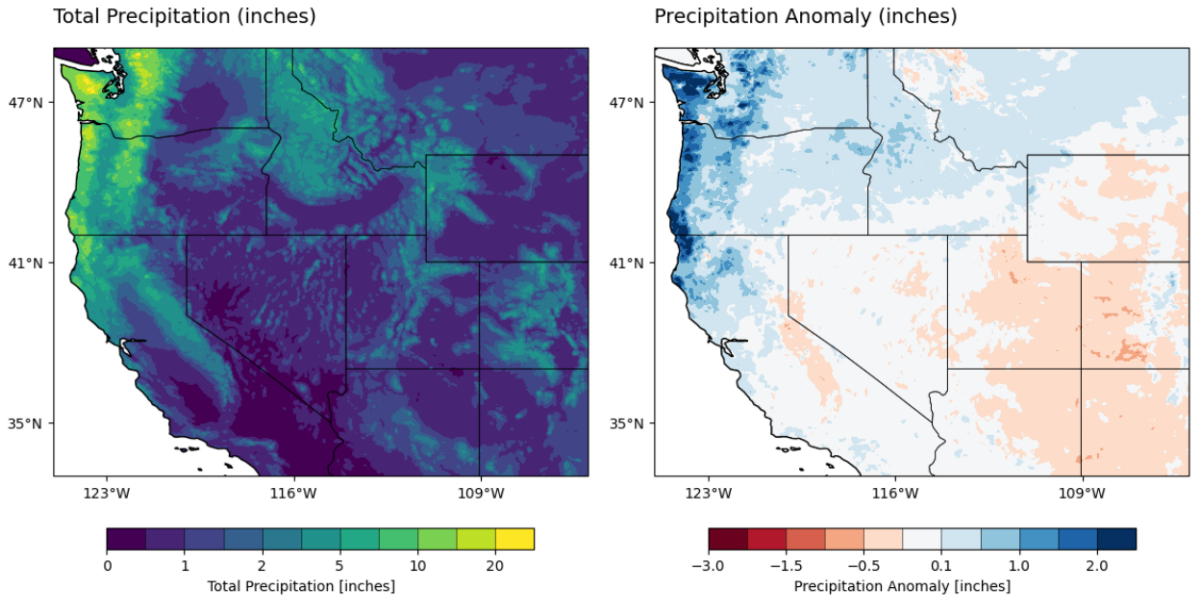


Figure 19: Seasonal Drought Forecast for the Intermountain West, September–November 2025[44]

STATE AND FEDERAL DISASTER DECLARATIONS

A review of the FEMA Disaster Declarations Database indicates that Morgan County has not received a federal major disaster declaration specifically for drought since the previous Morgan County Hazard Mitigation Plan update. This reflects FEMA's statutory limitations for drought assistance programs and differs from agricultural disaster designations administered by the U.S. Department of Agriculture (USDA).

However, statewide emergency actions have been implemented in response to drought conditions affecting Utah. Governor Spencer Cox issued executive orders declaring a state of emergency due to drought on March 17, 2021, and April 21, 2022, which applied statewide, including Morgan County. In addition, the USDA has issued multiple agricultural disaster designations affecting Morgan County due to drought impacts on crop production and livestock operations. Since 2019, fourteen USDA disaster declarations related to drought have included Morgan County, reflecting the significant agricultural impacts associated with extended dry conditions in the region.

Aside from these statewide emergency actions and agricultural disaster designations, Morgan County has not received a state or federal disaster declaration specifically for drought impacts since the last plan update.

Probability and Effects of Future Conditions

Based on historical climate records, drought monitoring data, and statewide water supply trends, the probability of drought affecting Morgan County within the next five years is considered Highly Likely.

[44] Utah State University, Utah Climate Center, 2025, Seasonal Drought Forecast (usu.edu)

With the county's population projected by some planning scenarios to increase substantially within the next two decades, demand for potable and secondary irrigation water will continue to rise, making periodic restrictions and water-supply shortages increasingly common. Seasonal measures such as no-watering days and the expanded use of secondary irrigation systems are now considered routine management tools rather than emergency responses.

Drought recurrence in Morgan County is closely linked to snowpack deficits in the Weber River headwaters, which supply the county's primary reservoirs and surface-water systems. Historical data from the U.S. Drought Monitor and snow-water equivalent (SWE) records indicate that some form of drought has occurred in roughly seven out of every 10 years, with severe drought (D3 or greater) conditions occurring about once per decade. The Utah Division of Water Resources projects that both the frequency and intensity of moderate to severe drought events will continue to increase, driven by rising temperatures, earlier snowmelt, and longer dry seasons.

To monitor and anticipate changing drought conditions, county staff and water providers track a set of local indicators:

- Percent of median April 1 SWE
- End-of-season reservoir storage levels
- Number of days under mandatory water-use restrictions
- Duration of the secondary irrigation season
- Number of wells reporting below-normal static water levels

Higher average temperatures also intensify environmental and public health impacts related to drought. As shown in Figure 20, increasing temperatures contribute to secondary hazards such as wildfire, flash flooding, air-quality degradation, and surface-water contamination. These factors collectively elevate community health risks and strain emergency and public works resources. Warmer conditions are also expected to expand the range of vector-borne diseases and other health threats previously uncommon in northern Utah.

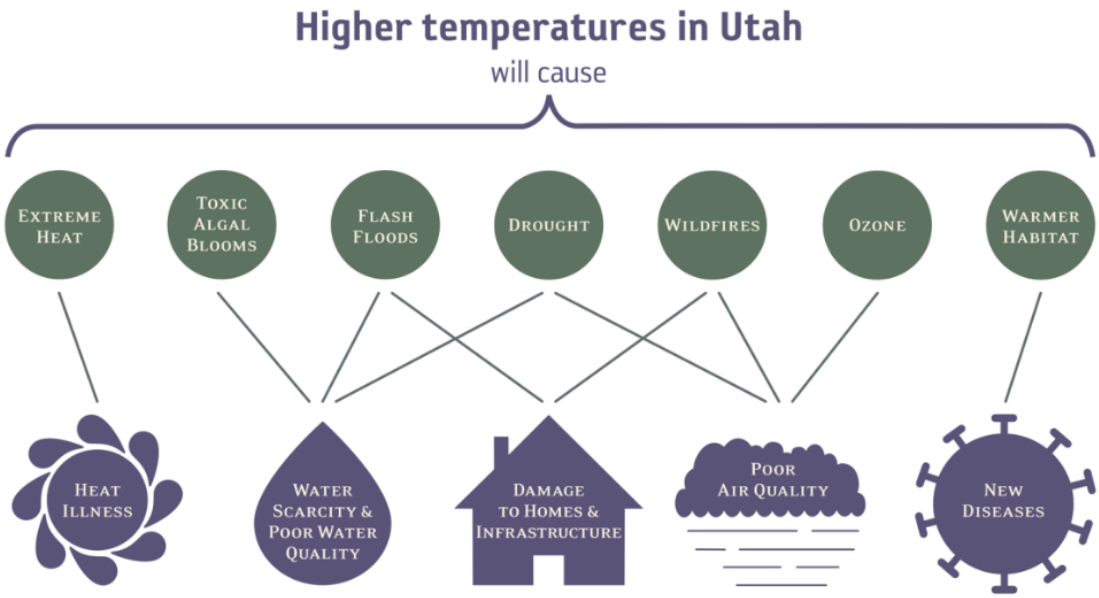


Figure 20: Impact of Higher Temperatures in Utah[45]

The 2024 Utah Enhanced Hazard Mitigation Plan notes that statewide warming trends have been widely documented and are directly contributing to more severe and prolonged droughts. Although Utah remains one of the nation's driest states, its reliance on limited natural precipitation makes it particularly vulnerable to even modest shifts in climate conditions. Proactive identification of system vulnerabilities—such as aging infrastructure, limited storage redundancy, and inequities in water access—will be critical for reducing future drought impacts.

Finally, Figure 21 illustrates water-year precipitation changes, standardized to highlight climate anomalies. The observed record (blue line) reveals the cyclical pattern typical of northern Utah's climate, driven by long-term variations in the western tropical Pacific and shifts in the jet stream position. Understanding these patterns will continue to inform long-range water-resource planning and mitigation efforts.

[45] Natural History Museum of Utah, "Understanding Climate Change in Utah," 2025, https://nhmu.utah.edu/climate-of-hope/climate-change-utah.

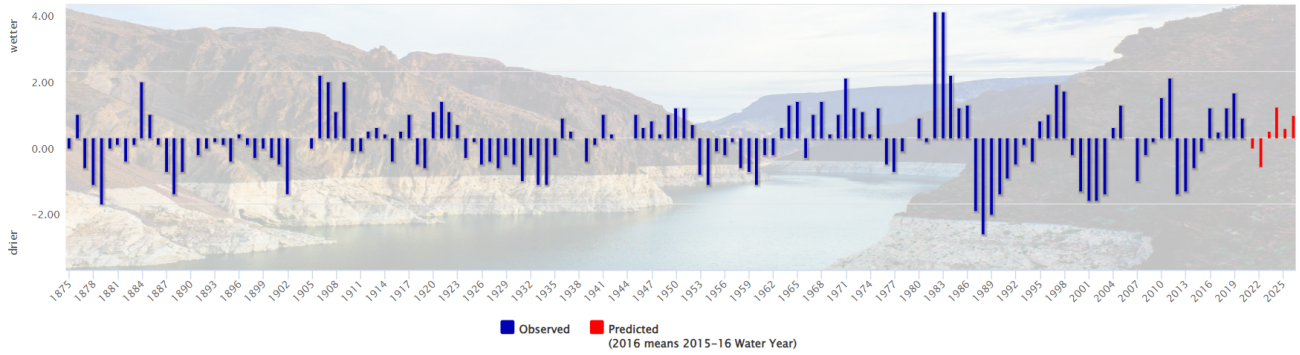


Figure 21: Northern Utah Climate Variability and Prediction[46]

[46] Utah Climate Center, "Northern Utah Climate Variability and Prediction," 2025, https://climate.usu.edu/snowForecast.php.

Earthquake

Hazard Definition

Earthquakes result from the sudden release of energy along faults within the Earth's crust, producing ground shaking and potential surface rupture. Morgan County lies within the Intermountain Seismic Belt (ISB), one of the most active seismic regions in the western United States. The primary local feature is the Weber Segment of the Wasatch Fault Zone, capable of producing large-magnitude earthquakes (magnitude 6.5–7.5, abbreviated as M6.5–M7.5). Earthquakes may also induce secondary hazards such as landslides, liquefaction, surface fault rupture, dam failure, and utility disruption.

Earthquake events are unique hazard events in that they can bear a direct relationship with various other hazards. Secondary effects can include fault rupture, landslides, dam failure, and avalanche. Damage to road and rail infrastructure can complicate disaster response efforts.

The Federal Emergency Management Agency, the U.S. Geological Survey (USGS), and the Utah Geological Survey (UGS) classify Morgan County as having a moderate to high seismic hazard due to its proximity to Quaternary faults and valley-fill sediments that can amplify ground shaking.

Geographic Location

Utah's earthquake hazard is greatest within the ISB, which extends 800 miles from Montana to Nevada and Arizona, and trends from north to south through the center of Utah. Morgan County's seismic exposure is defined by its location along the Weber Segment of the Wasatch Fault Zone. The County also includes several mapped Quaternary faults and landslide-susceptible areas. The highest potential shaking intensities would occur in the Morgan Valley, where unconsolidated alluvial and lacustrine deposits may amplify ground motion. Areas of reduced shaking hazard exist in the eastern highlands underlain by bedrock.

Figure 22 shows how stretching, or horizontal extension, of the crust produces a type of dipping (or inclined) fault called a "normal" fault. The movement of normal faults is characterized by the crust above the fault plane moving down relative to the crust below the fault plane. This vertical movement differs from movement on strike-slip faults like the San Andreas in California, where the crust on one side of the fault slides horizontally past the crust on the other side.[47]

[47] Earthquakes.utah.gov, "Geology of Earthquakes in Utah," 2025, https://earthquakes.utah.gov/#geology.

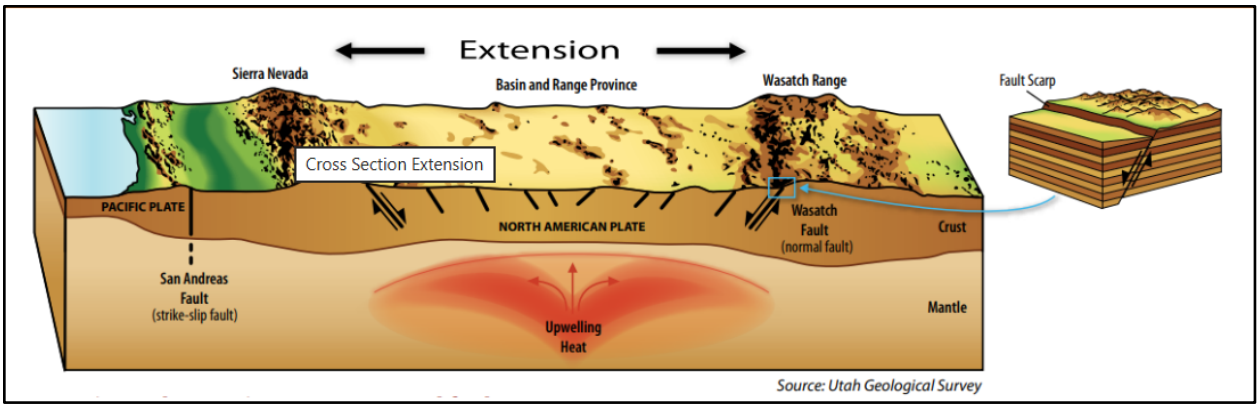


Figure 22: Western Section of North American Plate Diagram in Utah[48]

Figure 23 is a conceptual diagram of a generalized cross section showing a fault rupture that causes an earthquake and generates seismic waves, illustrating how the Wasatch Fault affects the Salt Lake Valley.[49] Figure 24 shows the location of fault lines in or near Morgan County.

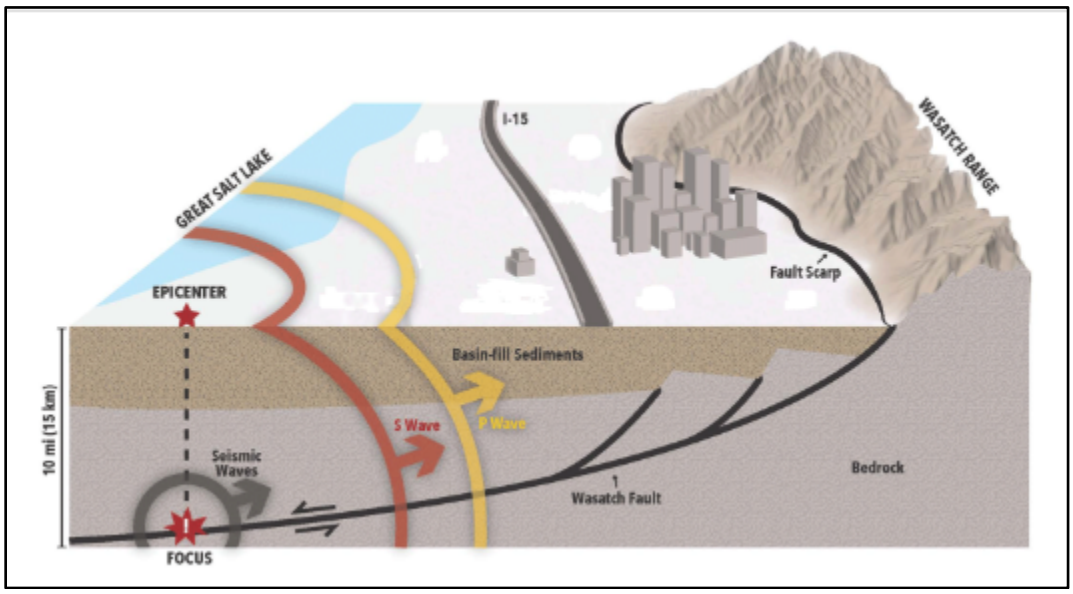


Figure 23: Conceptual Diagram of Wasatch Fault Rupture Cross Section in the Salt Lake Valley[50]

[48] Earthquakes.utah.gov, "Geology of Earthquakes in Utah: Diagram of Western Section of North American Plate," 2025, https://earthquakes.utah.gov/#geology.
[49] Earthquakes.utah.gov, "Geology of Earthquakes in Utah," 2025, https://earthquakes.utah.gov/#geology.
[50] Earthquakes.utah.gov, "Geology of Earthquakes in Utah: Conceptual Diagram of Wasatch Fault Rupture Cross Section," 2025, https://earthquakes.utah.gov/#geology.

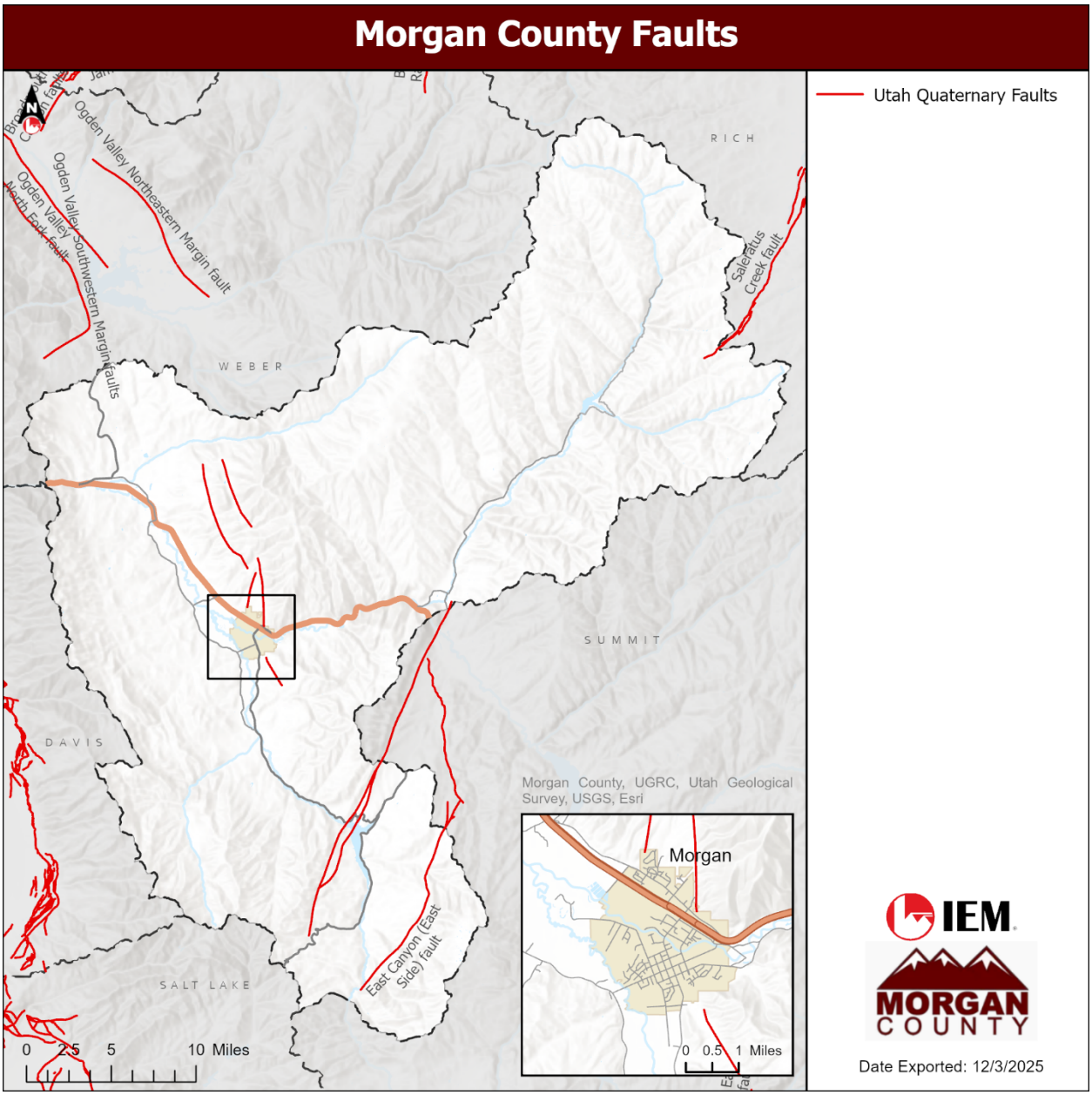


Figure 24: Location Fault Lines, Morgan County

The Utah Geological and Mineralogical Survey study on geological hazards in Morgan County includes the Engineering Geology Map of Morgan County, which shows that the most hazardous terrain consists of mudstone, sandstone, marl, and conglomerate belonging to the Tuffaceous Member of the Salt Lake Formation. The beds of this formation contain varying amounts of volcanic debris, some of which are broken down into clay minerals. The clay content of the formation most frequently creates problems of mass movement, slope stability, expansiveness, and sewage effluent removal.[51]

[51] Utah Geological and Mineralogical Survey, *Geological Hazards in Morgan County with Applications to Planning*, Bulletin 93 (February 1972), https://ugspub.nr.utah.gov/publications/bulletins/B-93.pdf.

A recurrent threat to Morgan County, particularly in hillside developments, is earthquakes that originate along the Wasatch Front. A medium-to-high-magnitude quake in the Ogden vicinity, for example, easily shakes houses in Morgan; earthquakes originating some distance from the county line have been felt in Morgan City. Hillside slope failures likely would be triggered by such a tremor, especially where slopes are presently only marginally stable. Many of the historic landslides were probably triggered in this fashion.[52]

Generally, earthquakes in Utah are associated with active faults in the Earth's crust. None of the faults in Morgan County have been definitively determined to be active by geologists or seismologists. Nevertheless, several faults have displaced geologic materials of Pliocene or Pleistocene age. These faults—the East Canyon Fault and the Morgan Fault—have not been conclusively shown to be inactive.[53]

Table 19: Fault Zones in Morgan County[54]

Name	Fault Type	Length (km)	Time of Most Recent Deformation	Recurrence Interval
Main Canyon Fault (formerly East Canyon Fault)/Weber Segment	Normal	26	Latest Quaternary (<15 ka)	None
Morgan Fault/Weber Segment	Normal	17	Latest Quaternary (<15 ka) to middle and late Quaternary (<750 ka)	25–100 kyr

Abbreviations: km = kilometers; ka = thousand years ago; kyr = thousand years.

Magnitude and Severity

Earthquakes are described in terms of magnitude and intensity. Earthquakes are multi-hazard events with the potential to cause extensive damage and loss of life. The Richter scale was developed in 1935 by Charles F. Richter of the California Institute of Technology as a mathematical tool used to compare earthquake sizes. On the Richter scale, magnitude is expressed in whole numbers and decimals. For example, an M5.3 might be computed for a moderate earthquake, and a strong earthquake might be rated M6.3.

Ground motion can be directly measured in terms of velocity, acceleration, and amplitude (displacement). The amount of energy released during an earthquake is now most commonly expressed on the moment magnitude scale, which measures energy released at the fault or epicenter as recorded on seismographs. The moment magnitude scale has largely replaced the Richter scale in modern seismology.

[52] Utah Geological and Mineralogical Survey, *Geological Hazards in Morgan County with Applications to Planning*, Bulletin 93 (February 1972), https://ugspub.nr.utah.gov/publications/bulletins/B-93.pdf.
[53] Utah Geological and Mineralogical Survey, *Geological Hazards in Morgan County with Applications to Planning*, Bulletin 93 (February 1972), https://ugspub.nr.utah.gov/publications/bulletins/B-93.pdf.
[54] Utah Geological Survey, *Earthquake Probabilities for the Wasatch Front Region in Utah, Idaho and Wyoming*, 2016, https://ugspub.nr.utah.gov/publications/misc_pubs/mp-16-3/mp-16-3.pdf.

Another measure of earthquake effects is intensity, which is an expression of the amount of shaking at a given location on the surface as felt by humans, as measured by the Modified Mercalli Intensity (MMI) Scale. It is typically the greatest cause structural losses during earthquakes and is determined by many factors, including the distance from the epicenter and local soil types. Table 20 lists abbreviated descriptions of the 12 levels of intensity of the MMI Scale.

Table 20: Magnitude/Intensity Comparison for Earthquakes[55]

Magnitude	Typical Maximum MMI	Abbreviated Modified Mercalli Intensity Scale
1.0–3.0	I	I. Not felt except by a very few under especially favorable conditions.
3.0–3.9	II–III	II. Felt only by a few persons at rest, especially on the upper floors of buildings.
		III. Felt quite noticeably by persons indoors, especially on the upper floors of buildings. Many people do not recognize it as an earthquake. Standing motorcars may rock slightly. Vibrations are similar to the passing of a truck. Duration estimated.
4.0–4.9	IV–V	IV. Felt indoors by many and outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sounds. Sensation like a heavy truck striking a building. Standing motorcars rocked noticeably.
		V. Felt by nearly everyone; many awakened. Some dishes and windows broken. Unstable objects overturned. Pendulum clocks may stop.
5.0–5.9	VI–VII	VI. Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
		VII. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
6.0–6.9	VII–IX	VII. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
		VIII. Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage is great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
		IX. Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.

[55] US Geological Survey, "Magnitude/Intensity Comparison," last modified September 29, 2014, https://www.nrc.gov/docs/ML1821/ML18214A882.pdf.

Magnitude	Typical Maximum MMI	Abbreviated Modified Mercalli Intensity Scale
7.0 and higher	**VIII or higher**	VIII. Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
		IX. Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
		X. Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.
		XI. Few, if any (masonry) structures remain standing. Bridges destroyed. The rails bent greatly.
		XII. Damage total. Lines of sight and level are distorted. Objects thrown into the air.

The severity of earthquake impacts in Morgan County depends on the magnitude, fault rupture proximity, soil type, and depth of shaking. The 2023 USGS National Seismic Hazard Model estimates peak ground accelerations of 0.35–0.50g with a 2% probability of exceedance in 50 years. This corresponds to MMI of VII to VIII, capable of causing moderate to severe damage in older buildings and unreinforced masonry structures.

Historical Occurrences

Earthquake activity within Morgan County and the broader Wasatch Front region is frequent but typically low in magnitude. The largest recorded earthquake centered in Morgan County occurred in 1955, with a magnitude of 3.67, and was felt throughout the Morgan Valley with no reported structural damage. Similar minor earthquakes have been recorded periodically in subsequent decades. However, the absence of recent large or damaging earthquakes does not indicate a lack of risk. The Weber Segment of the Wasatch Fault Zone and nearby Quaternary faults remain capable of producing major seismic events with significant regional impacts.

Across Utah, earthquake activity is common and well documented. The state experiences approximately 700 earthquakes annually, of which five to seven typically reach magnitudes of 3.0 or greater. On average, moderate earthquakes (M5.5–6.5) occur somewhere within Utah about once every decade, while large earthquakes (M6.5–7.5) occur approximately once every 50 years. These events are most often associated with the Wasatch Fault Zone and related faults that have ruptured within the last 15,000 years, including the East Canyon Fault and Saleratus Creek Fault, both located within the regional fault system influencing Morgan County.

Although no major earthquakes have originated within Morgan County in recent history, strong shaking from regional events has been experienced multiple times. The 2020 Magna earthquake (M5.7), centered about 60 miles southwest of Morgan County, demonstrated the vulnerability of older and unreinforced masonry structures, as well as critical facilities not built to current seismic standards. Given the County's proximity to the Weber Segment and the presence of several active and potentially active faults, a future moderate-to-large earthquake remains a credible and significant hazard. Figure 25 shows the epicenters of earthquakes in or near Morgan County with a magnitude of 2.0 or higher since 1850. UGS provided data from 1850 to 2017, and locations of more recent earthquakes were obtained from the USGS Earthquake Catalog.

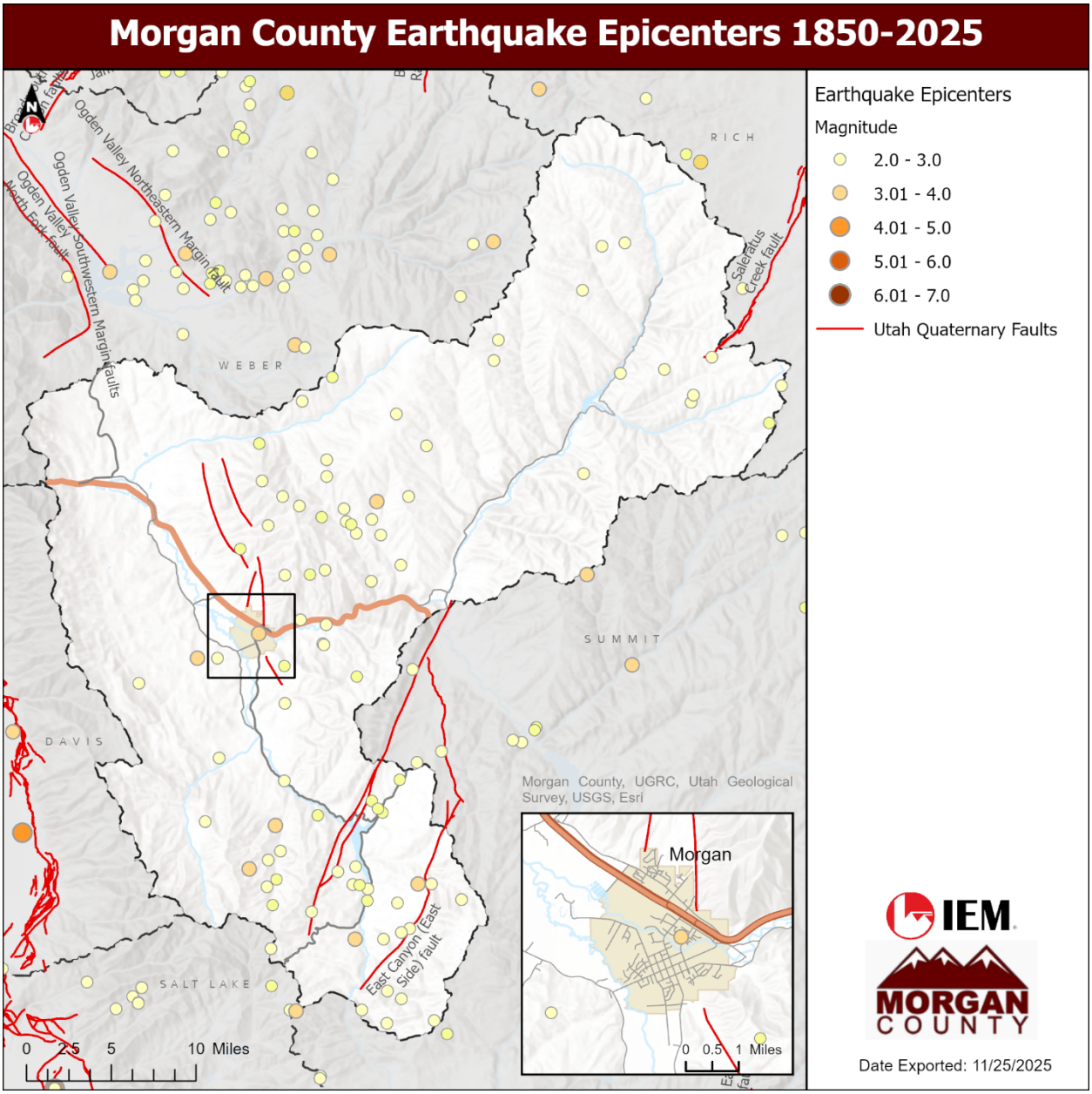


Figure 25: Earthquake Epicenters, Morgan County, 1850–2025

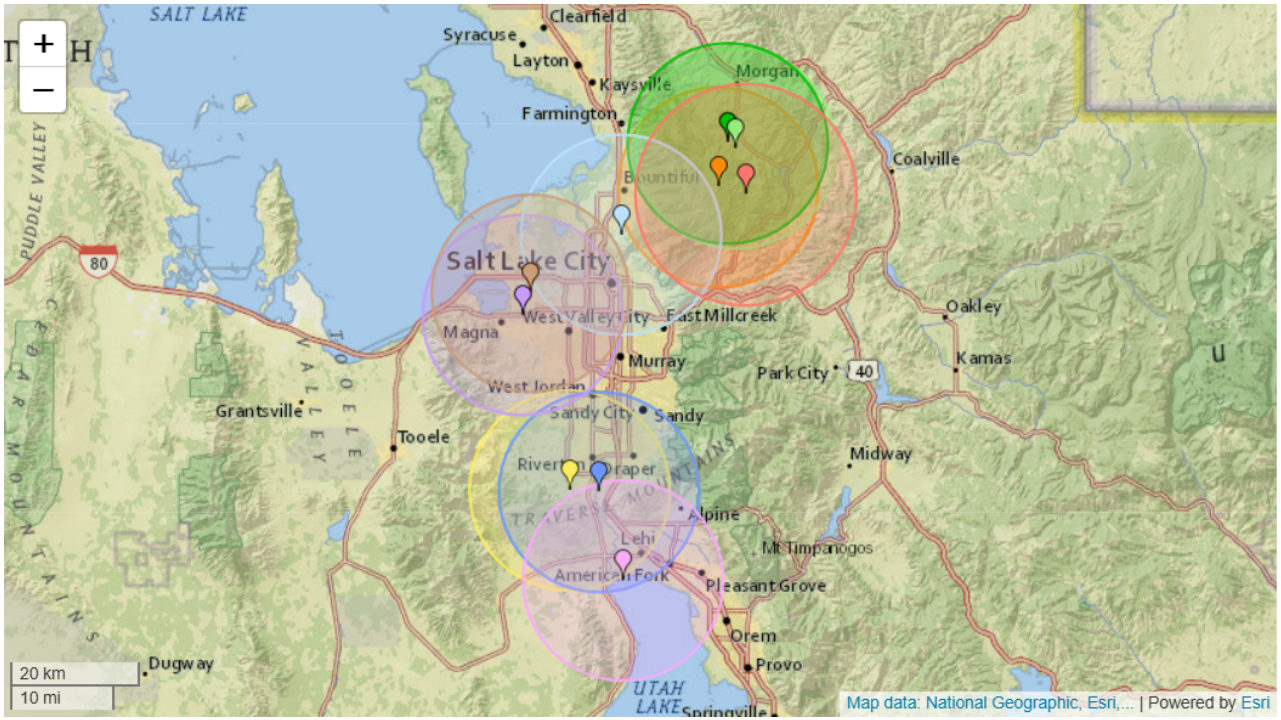
RECENT EARTHQUAKE ACTIVITY

Since 2021, no significant earthquakes have caused damage in Morgan County, and there have been no state or federal disaster declarations for earthquakes. Minor seismic activity has been limited to aftershocks from the 2020 Magna earthquake, which gradually declined in frequency through 2022.

On the morning of Wednesday, March 18, 2020, northern Utah experienced a magnitude 5.7 earthquake with an epicenter just north of Magna, Utah. The mainshock was widely felt across the Wasatch Front, with over 30,000 "Did You Feel It?" reports submitted to the USGS and the University of Utah Seismograph Stations. The event caused moderate structural damage in Salt Lake County and triggered more than 2,500 aftershocks, including several in the M3.0–4.0 range that were felt across northern Utah for months afterward.

While Morgan County reported no direct damage, the Magna earthquake underscored the region's shared vulnerability to major seismic events originating on the Wasatch Fault Zone, emphasizing the need for continued building-code compliance, retrofit initiatives, and public preparedness outreach.

Figure 26 illustrates earthquake events across the Wasatch Front Urban Area from January through October 2025, displaying event magnitudes, locations, and depths recorded during the monitoring period.



2 hours ago 1.8 magnitude, 8 km depth
Centerville, Utah, United States

3 months ago 1.8 magnitude, -2 km depth
Bluffdale, Utah, United States

4 months ago 1.5 magnitude, 5 km depth
Morgan, Utah, United States

4 months ago 1.6 magnitude, 7 km depth
Morgan, Utah, United States

6 months ago 1.8 magnitude, -2 km depth
Bluffdale, Utah, United States

6 months ago 1.7 magnitude, 11 km depth
Magna, Utah, United States

6 months ago 1.8 magnitude, 10 km depth
Saratoga Springs, Utah, United States

7 months ago 1.6 magnitude, -2 km depth
North Salt Lake, Utah, United States

8 months ago 1.5 magnitude, 8 km depth
Magna, Utah, United States

9 months ago 2.6 magnitude, 11 km depth
Morgan, Utah, United States

Figure 26: Earthquakes Near Wasatch Front Urban Area, January–October 2025[56]

[56] Earthquake Track, "Recent Earthquakes Near Wasatch Front Urban Area," January–October 2025, https://earthquaketrack.com/r/wasatch-front-urban-area-utah/recent.

STATE AND FEDERAL DISASTER DECLARATIONS

A review of the FEMA Disaster Declarations Database indicates that Morgan County has not received a federal major disaster declaration specifically for earthquake impacts since the previous Morgan County Hazard Mitigation Plan update. Similarly, the State of Utah has not issued a state disaster declaration specifically for earthquake damage affecting Morgan County during this period.

Although the March 18, 2020 Magna earthquake (M5.7) resulted in a federal disaster declaration for portions of Salt Lake County, Morgan County was not included in that declaration and did not report significant damage. Since 2021, minor seismic activity has occurred across the Wasatch Front region, but no earthquake events have resulted in state or federal disaster declarations for Morgan County since the last plan update.

Probability and Effects of Future Conditions

Based on historical seismic records, regional fault activity, and earthquake probability modeling conducted by the Utah Geological Survey, the probability of a damaging earthquake affecting Morgan County within the next five years is considered Possible.

The UGS projects a 57% probability that the Wasatch Front region will experience at least one M6.0 or greater earthquake within the next 50 years, and a 43% probability of an M6.75 or greater event in that same period.[57] These probabilities reflect long-term seismic potential across the region rather than near-term annual likelihood. Since 1847, Utah has recorded 17 earthquakes greater than M5.5, with geological evidence indicating numerous prehistoric earthquakes exceeding M6.5 prior to that time.[58]

Utah lies along the eastern edge of the Intermountain Seismic Belt, a broad zone of crustal extension that forms part of the boundary between the North American Plate and the Pacific Plate. Though this boundary lies hundreds of miles to the west, the tectonic stretching of the Great Basin continues to generate frequent seismic activity throughout the region, including along the Wasatch Fault Zone, which directly influences Morgan County.

Figure 27 provides summary information for Morgan County, including its risk level (High), the total number of earthquakes recorded since 1931 (369), and a 53.14% probability of experiencing an M5.0 earthquake within the next 50 years.

[57] Utah Geological Survey, "Utah Earthquake Probabilities," 2016, https://geology.utah.gov/hazards/info/workshops/working-groups/earthquake-probabilities/.
[58] Earthquakes.Utah.Gov, "Earthquakes in Utah," n.d., https://earthquakes.utah.gov/#:~:text=Utah%20has%20experienced%2017%20earthquakes%20greater%20than,Utah%20through%20research,%20education,%20and%20public%20service.

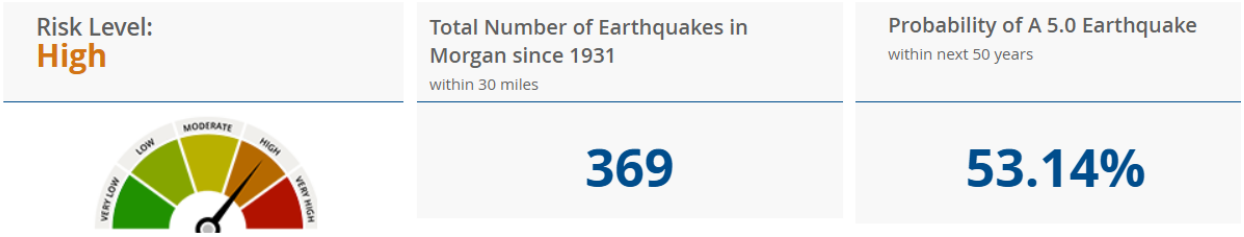


Figure 27: Earthquake Information for Morgan County, Risk Level, Total, and Probability[59]

Pictured in Figure 28 is the Wasatch Fault Zone, one of the most active and well-studied fault systems in the world. Extending roughly 240 miles from Malad City, Idaho, through northern Utah and southward to Fayette, Utah, the fault consists of 10 distinct segments, each approximately 25 miles in length. Each segment can rupture independently, with the potential to produce earthquakes up to M7.5.

The average recurrence interval for large earthquakes on the central segments of the Wasatch Fault is approximately 300 years collectively, or 900 to 1,500 years for any individual segment. Current forecasts estimate an 18% probability (a 1 in 5 chance) of a major earthquake on one of the Wasatch Fault's central segments within the next 50 years.

Morgan County is situated along the Weber Segment of the Wasatch Fault Zone, which forms the County's western boundary and represents its most significant seismic hazard (see Figure 28). This proximity places the County within the direct influence area of a fault capable of generating strong ground shaking and secondary effects such as liquefaction, landslides, and infrastructure damage.

[59] HomeFacts, "Earthquake Information for Morgan, Utah," 2025, https://www.homefacts.com/earthquakes/Utah/Morgan-County/Morgan.html.

Figure 28: Wasatch Fault and Segments[60]

Figure 29 shows earthquake ground shaking potential, based on the National Seismic Hazard Model, which represents peak ground accelerations with a 2% probability of being exceeded in 50 years. Morgan County could experience strong to severe ground shaking during an earthquake.

[60] Earthquakes.utah.gov, "Large Earthquakes on the Wasatch Fault," 2025, https://utahdnr.maps.arcgis.com/apps/Cascade/index.html?appid=a40122474bcf4f13a2c17a82039403df.

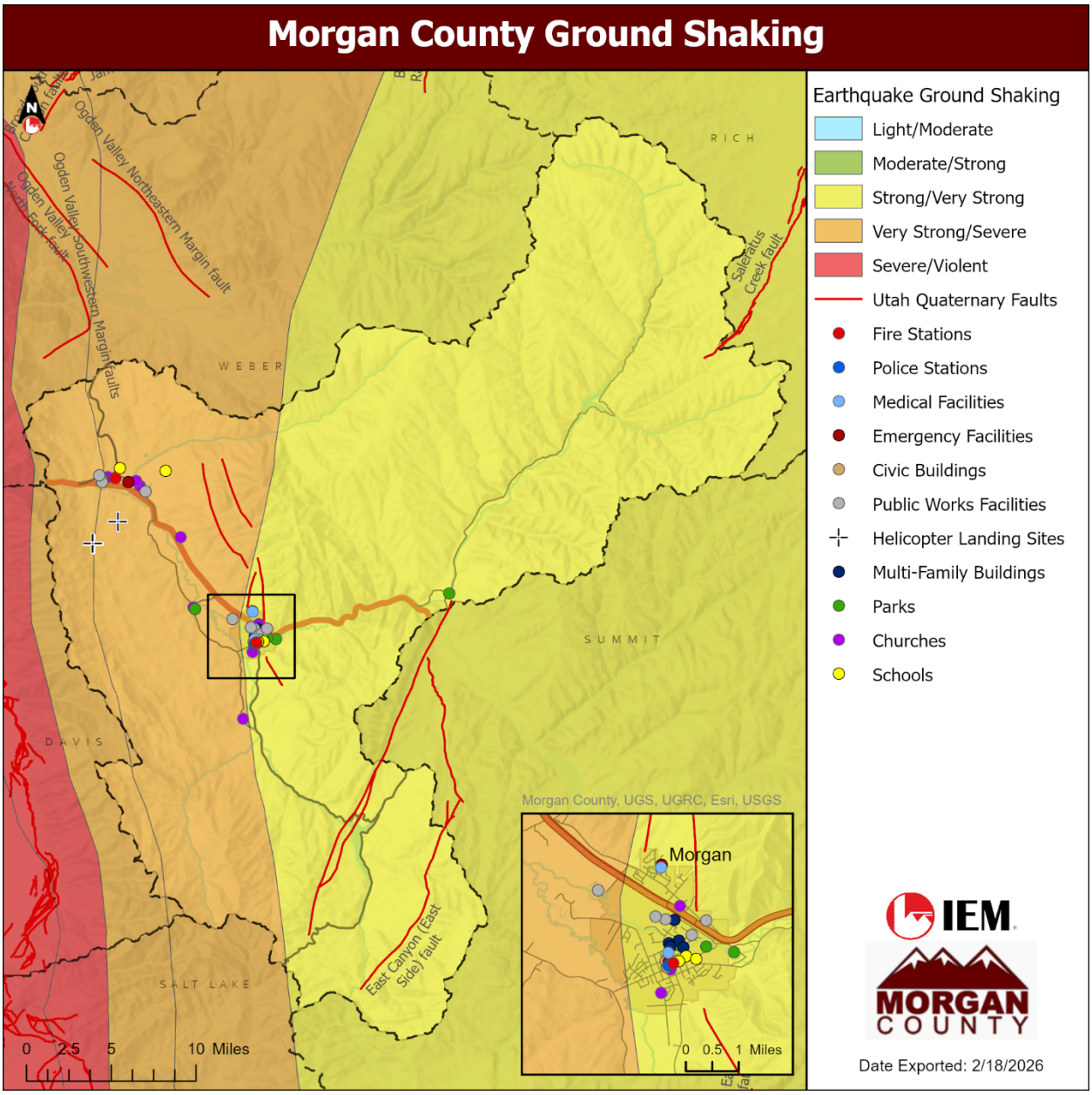


Figure 29: Ground Shaking Potential, Morgan County

Erosion

Hazard Definition

Erosion is the gradual wearing away, detachment, and transport of soil, rock, or sediment from the Earth's surface by wind, water, ice, or gravity. It can occur naturally over long periods but is often accelerated by land disturbance, development, vegetation loss, wildfires, and intense precipitation. In mountainous regions such as Morgan County, erosion presents a significant hazard to infrastructure, agriculture, water quality, and slope stability, particularly in steep canyon terrain and along waterways.

Erosion varies widely in form and severity—from slow, diffuse sheet erosion across agricultural lands to concentrated gully and streambank erosion capable of undermining roads, utilities, and structures. Key factors influencing erosion potential include soil type, slope gradient, vegetation cover, land-use practices, and precipitation intensity. When left unmanaged, erosion can lead to the loss of fertile topsoil, sedimentation of waterways and reservoirs, increased flood risk, and long-term ecological degradation.

Morgan County lies within the Weber River Basin on the Wasatch Back of northern Utah, where steep canyons, erodible soils, and periodic high-intensity rain or snowmelt events drive natural and accelerated erosion processes. The county's population centers—Morgan City and Mountain Green—are situated in valley bottoms that receive sediment and runoff from surrounding slopes, while rural and agricultural lands in Porterville, Milton, and Enterprise experience chronic soil loss from stormwater and irrigation drainage.

According to the Utah Geological Survey (UGS) and the Utah Division of Water Quality (DWQ), erosion and sediment transport within the Weber River and East Canyon watersheds are among the leading contributors to stream impairment. The Weber River Basin Climate Vulnerability Assessment also identifies sediment accumulation in East Canyon Reservoir and Lost Creek Reservoir as ongoing challenges that reduce storage capacity and affect water quality.[61]

Erosion hazards in Morgan County are most pronounced in areas with steep slopes, sparse vegetation, or recent disturbance—including post-wildfire landscapes, unpaved rural roads, and construction zones. Streambank erosion along East Canyon Creek, Lost Creek, and Hardscrabble Creek threatens local roads, bridges, and irrigation systems, particularly during spring runoff and following intense storms.

Erosion is a chronic, climate-sensitive hazard that directly interacts with flooding, landslides, and drought. Under FEMA's 2025 policy, erosion hazards are assessed as both direct and secondary impacts of precipitation intensity, vegetation loss, and land disturbance.

[61] Western Water Assessment et al., Weber River Basin Climate Vulnerability Assessment, January 2021, https://wwa.colorado.edu/sites/default/files/2021-08/Weber_River_Basin_Climate_Vulnerability_Assessment.pdf.

Geographic Location

Erosion hazard locations in Morgan County are concentrated along steep slopes, riverbanks, and disturbed lands within the upper Weber River Basin and the Wasatch Back terrain. Areas most affected include upland watersheds, canyon drainages, and agricultural valleys where natural processes, stormwater runoff, and human disturbance accelerate soil and streambank loss.

Erosion-prone zones occur primarily in the central, eastern, and northern portions of the County, where slopes exceed 15%–30% and soils are classified as highly erodible under Natural Resources Conservation Service (NRCS) mapping. Major erosion sources include surface runoff from unpaved roads, streambank undercutting along the Weber River and its tributaries, and sediment transport into reservoirs and irrigation systems.

Geographically, erosion concern areas for Morgan County are located in the following regions:

- **East Canyon/Porterville Area:** Steep slopes above East Canyon Creek and East Canyon Reservoir experience seasonal runoff erosion and sedimentation, especially during spring snowmelt or following intense rainfall. The Utah DWQ has listed East Canyon Creek as impaired for sediment under Section 303(d) of the Clean Water Act.
- **Lost Creek Drainage (Devils Slide Vicinity):** Exposed shale and alluvial soils contribute to ongoing slope and gully erosion, affecting access roads, rangeland, and contributing sediment to Lost Creek Reservoir, which has documented capacity reduction due to sedimentation.
- **Hardscrabble Canyon and Upper Weber Canyon:** These steep, narrow canyons show active streambank erosion and channel migration, particularly after high-flow events. Sediment from these canyons impacts Weber River water quality and downstream infrastructure.
- **Mountain Green Foothills and Construction Areas:** Ongoing residential and commercial development has disturbed natural drainage networks, causing localized erosion, sediment transport, and downstream stormwater issues, particularly along new subdivisions and road corridors.

Erosion occurs year-round, with the greatest activity from March through June during snowmelt and spring storms, and secondary surges after intense summer thunderstorms. According to USDA–NRCS Soil Survey data, over 40% of Morgan County's land area has moderate to severe erosion potential, and annual soil loss rates exceed 5 tons/acre in some agricultural and rangeland areas without conservation practices.

Erosion-related challenges in Morgan County vary by jurisdiction and are summarized as follows by location:

- **Mountain Green (Unincorporated):** Erosion and sediment runoff from construction and foothill development sites contribute to drainage issues affecting SR-167 (Trappers Loop) and local subdivisions. County stormwater management and best management practice (BMP) enforcement are key mitigation tools.

- **Morgan City/Porterville:** Streambank erosion along East Canyon Creek and Weber River threatens nearby agricultural lands, recreational assets, and low-lying infrastructure; stabilization and revegetation projects are ongoing.
- **Other Unincorporated Valleys (e.g., Lost Creek, Hardscrabble):** Rangeland erosion and gully formation following drought, overgrazing, or wildfire reduce soil productivity and increase downstream sedimentation hazards.

Magnitude and Severity

The magnitude and severity of erosion in Morgan County depend on factors such as slope gradient, soil type, vegetation cover, rainfall intensity, land-use practices, and proximity to waterways or development. Unlike sudden-onset hazards such as floods or landslides, erosion occurs gradually but can produce substantial cumulative damage to soil productivity, infrastructure, and water quality. Severe erosion can destabilize slopes, undercut roads or streambanks, and cause costly sedimentation in reservoirs and irrigation systems.

Erosion intensity is commonly measured using soil loss rates, expressed in tons per acre per year (tons/acre/year), or by streambank retreat rates (feet/year). The USDA–NRCS classifies erosion hazard severity as follows:

- **Slight:** 0–2 tons/acre/year – Minimal soil loss; typically stable, vegetated slopes or undisturbed land.
- **Moderate:** 2–5 tons/acre/year – Noticeable rilling or topsoil loss; common on lightly disturbed agricultural or construction areas.
- **Severe:** 5–10 tons/acre/year – Significant topsoil loss affecting productivity and slope stability.
- **Very Severe:** More than 10 tons/acre/year – Rapid loss of soil and subsoil, resulting in deep gullies, streambank collapse, or sedimentation of downstream infrastructure.

According to USDA–NRCS Soil Survey data, approximately 35%–45% of Morgan County's land area is rated moderate to high in erosion potential, particularly in areas of steep slopes (>15%) and erodible soils such as loams and sandy clay loams. The Weber River Basin Climate Vulnerability Assessment identifies erosion and sedimentation as key threats to reservoir function, estimating that East Canyon Reservoir sedimentation rates exceed 1,000–2,000 cubic yards/year under current hydrologic and land-use conditions.[62]

Figure 30 illustrates the areas of slight to severe soil erosion hazard in Morgan County according to USDA–NRCS Soil Survey data.

[62] Western Water Assessment et al., Weber River Basin Climate Vulnerability Assessment, January 2021, https://wwa.colorado.edu/sites/default/files/2021-08/Weber_River_Basin_Climate_Vulnerability_Assessment.pdf.

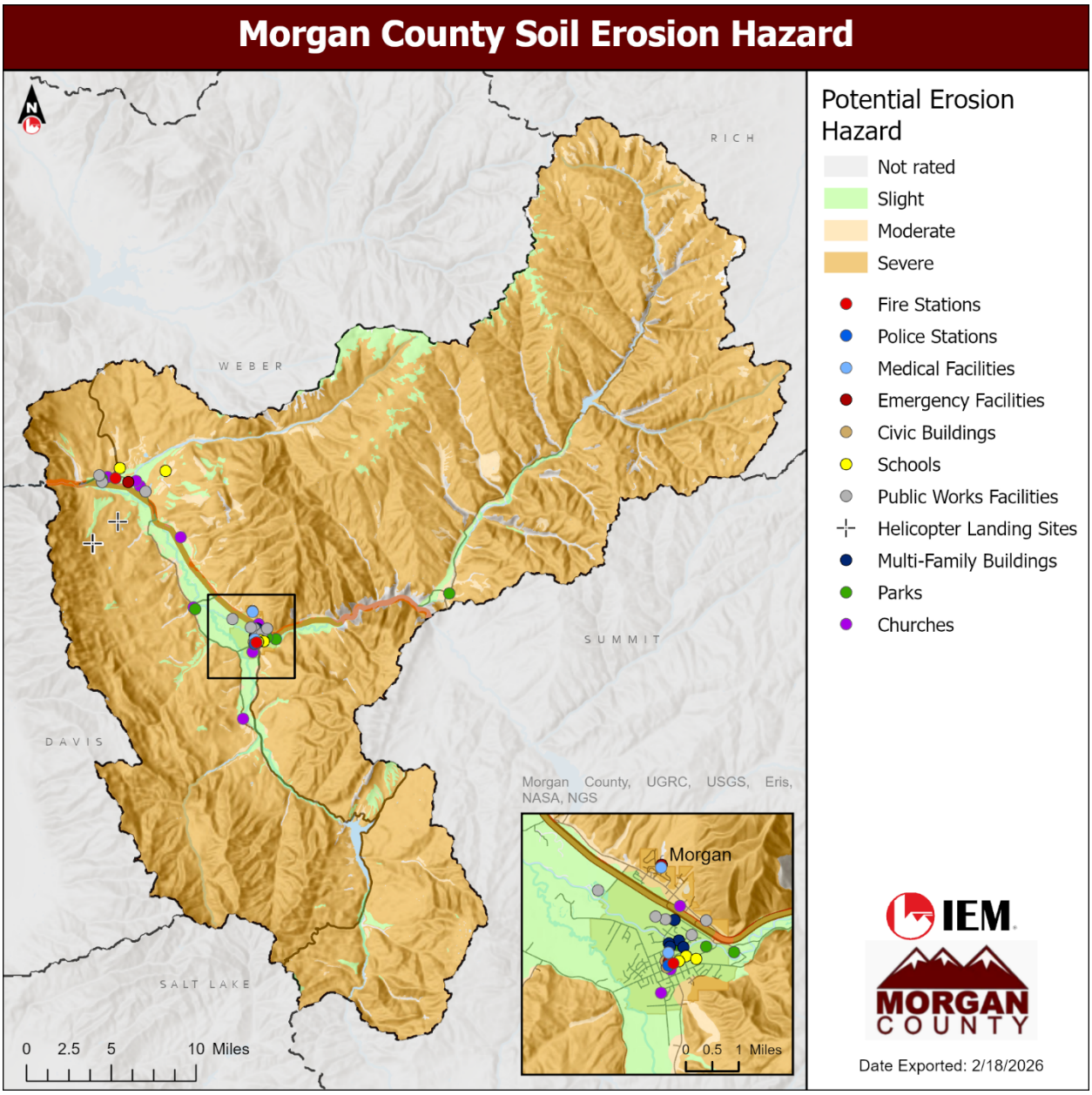


Figure 30: Soil Erosion Hazard in Morgan County

MODELED AND OBSERVED EROSION CHARACTERISTICS

Where data are available from the UGS, USDA–NRCS, or Utah DWQ, typical erosion characteristics in Morgan County include the following:

- **Sheet and Rill Erosion:** Widespread on agricultural and construction lands; losses of 2–6 tons/acre/year are common without BMPs.
- **Gully Erosion:** Concentrated in unpaved roads and disturbed slopes; channel incision rates up to 0.5–1.5 feet/year in some drainages.

- **Streambank Erosion:** Along the Weber River, East Canyon Creek, and Lost Creek, lateral channel migration of 1–3 feet/year is observed during peak runoff seasons.
- **Reservoir Sedimentation:** Notable in East Canyon and Lost Creek Reservoirs, where accumulated sediment reduces water storage and increases turbidity, impacting aquatic ecosystems.

Erosion debris can include fine sediments, gravel, and organic material that degrade water quality and fill culverts, ditches, and reservoirs, leading to elevated maintenance costs for local agencies.

CRITICAL FACILITIES AND LIFELINES AT RISK

Populated areas and critical facilities at or near erosion-prone zones include the following:

- **Transportation corridors**, such as State Route 66, Interstate 84, and SR-167, where roadside and slope erosion can undermine embankments or cause debris deposition during heavy rainfall.
- **Water and irrigation infrastructure**, including canals, culverts, and reservoir embankments, which are vulnerable to sediment accumulation and reduced hydraulic capacity.
- **Public utilities and bridges** located along river and creek channels that are subject to undercutting and scour.
- **Agricultural lands**, particularly in Porterville, Enterprise, and Milton, where loss of topsoil affects long-term soil fertility and productivity.

Damage to these systems could disrupt irrigation supply, transportation safety, and water quality throughout the Weber River watershed.

Erosion hazard extent in Morgan County is best characterized as moderate to high in specific localized areas, with recurring soil loss rates exceeding 5 tons/acre/year on disturbed slopes. Although rarely life-threatening, erosion's cumulative economic impacts—including maintenance costs, sediment dredging, and long-term soil productivity loss—can exceed those of short-term flood events.

Historical Occurrences

Morgan County has not experienced a single catastrophic erosion event resulting in widespread loss of life or property; however, chronic and localized erosion has been a persistent issue throughout the county's watersheds. Historical records from the UGS, Utah DWQ, USDA–NRCS, and Weber Basin Water Conservancy District (WBWCD) indicate that streambank, hillslope, and soil erosion have contributed to recurring infrastructure and water-quality impacts over the past several decades.

Although no large, single erosion disaster has occurred, multiple documented erosion and sedimentation events have affected roads, reservoirs, and agricultural lands in and near Morgan County:

- **East Canyon Watershed – 2008–present:** Ongoing streambank erosion along East Canyon Creek has led to sediment impairment listings under Section 303(d) of the Clean Water Act. Sediment loading

has contributed to reduced water quality and algal blooms in East Canyon Reservoir, prompting long-term watershed restoration efforts led by DWQ and local stakeholders.

- **Lost Creek Reservoir and Drainage – 2011, 2019, and 2023:** High-intensity rainfall and spring runoff have accelerated slope erosion and sediment inflow into Lost Creek Reservoir. WBWCD monitoring in 2019 recorded turbidity spikes exceeding 50 NTU, with estimated sediment inflows exceeding 1,500 cubic yards after storm events. These conditions required periodic dredging and reservoir maintenance.
- **Hardscrabble Canyon – 2017 and 2023:** Heavy rain following dry summer conditions triggered slope and gully erosion along unpaved access routes and steep canyon walls. Sediment deposition temporarily affected drainage culverts and ranch access roads, leading to localized flooding and repair needs.
- **Mountain Green Development Areas – 2020–2024:** Rapid residential and commercial construction on foothill slopes has resulted in localized stormwater erosion and sediment runoff, particularly near SR-167 (Trappers Loop) and I-84. County stormwater inspections have noted BMP failures and channel incision up to 1 foot deep in disturbed areas during wet years.
- **Porterville and Milton Agricultural Lands – Ongoing:** Long-term irrigation-related erosion and streambank undercutting have affected canal systems and private farmland. NRCS field assessments note that annual soil losses exceed 5–8 tons/acre/year on some rangelands and croplands without conservation practices.

According to the Utah DWQ's Integrated Report (2024), sedimentation and erosion remain among the top three nonpoint source water-quality concerns in the Weber River and East Canyon sub-basins. These processes contribute to increased nutrient loading, degraded aquatic habitat, and reduced reservoir storage capacity.

These recurring erosion and sedimentation incidents demonstrate a pattern of chronic land and water impacts rather than isolated catastrophic events, emphasizing the need for continuous management and BMP enforcement rather than post-disaster recovery.

STATE AND FEDERAL DISASTER DECLARATIONS

A review of the FEMA Disaster Declarations Database indicates that Morgan County has not received a federal major disaster declaration specifically attributed to erosion since the previous Morgan County Hazard Mitigation Plan update. Similarly, the State of Utah has not issued a state disaster declaration specifically for erosion impacts affecting Morgan County during this period.

Erosion impacts within the county typically occur as chronic or localized conditions associated with stormwater runoff, streambank instability, or land disturbance rather than as sudden disasters requiring state or federal assistance. As a result, no state or federal disaster declarations have been issued for erosion impacts in Morgan County since the last plan update.

Probability and Effects of Future Conditions

Based on historical watershed conditions, soil surveys, and documented erosion incidents across the Weber River Basin, the probability of erosion affecting Morgan County within the next five years is considered Likely.

Erosion in Morgan County is an ongoing process driven by steep terrain, erodible soils, seasonal runoff, and land disturbance. Historical records from the Utah Division of Water Quality, USDA Natural Resources Conservation Service, and local watershed assessments indicate recurring streambank erosion, hillslope soil loss, and sedimentation events in multiple locations across the county over the past two decades. These recurring conditions demonstrate that erosion is a persistent hazard that affects infrastructure, water quality, and agricultural productivity throughout the county.

Morgan County's combination of steep canyon terrain, alluvial valley deposits, and variable precipitation patterns produces natural conditions favorable to both surface and streambank erosion. High-risk zones include the following:

- **East Canyon and Porterville Drainages**, where streambank erosion and sedimentation impair water quality in East Canyon Creek (303[d]-listed for total suspended solids)
- **Lost Creek and Devils Slide**, characterized by highly erodible shale and siltstone that contribute to sediment inflow to Lost Creek Reservoir
- **Hardscrabble Canyon and Upper Weber River**, where channel migration and slope instability accelerate during spring runoff
- **Mountain Green Foothills**, where grading and construction runoff mobilize sediment into local drainageways

INFLUENCES ON FUTURE PROBABILITY

Erosion risk in Morgan County is influenced by a combination of environmental and human factors that are likely to intensify over time:

- **Climate Variability:** More frequent high-intensity storms, earlier snowmelt, and rain-on-snow events increase runoff volume and velocity, accelerating soil loss and streambank instability. The 2022–2023 water year—one of Utah's wettest on record—resulted in extensive slope washouts and sedimentation throughout the Weber River Basin.
- **Land Development:** Expansion of residential and transportation infrastructure—particularly in Mountain Green and Morgan Valley—disturbs soils and increases impervious surfaces, amplifying stormwater discharge and channel erosion.
- **Wildfire and Vegetation Loss:** Post-fire landscapes lose ground cover, exposing slopes to rill and gully erosion during subsequent precipitation events.
- **Agricultural Practices:** Overgrazing, unlined irrigation channels, and compacted soils continue to exacerbate rangeland erosion.

- **Reservoir Sedimentation:** Ongoing deposition in East Canyon and Lost Creek Reservoirs reduces storage capacity and increases dredging frequency, amplifying maintenance costs for water providers.

Collectively, these trends suggest that erosion hazards will remain persistent and may intensify in localized areas, even where mitigation programs are in place. While annual precipitation totals may not change substantially, the distribution and intensity of rainfall events are expected to increase soil movement and sediment delivery to streams and reservoirs.

EXPECTED EFFECTS IF SEVERE EROSION OCCURS

If significant or widespread erosion occurs in Morgan County, the most likely consequences would include the following:

- **Transportation:** Shoulder and slope failures along SR-66, SR-167, and local canyon roads; blocked culverts and increased maintenance costs.
- **Water Infrastructure:** Sediment buildup in East Canyon and Lost Creek Reservoirs, reduced water quality, and decreased reservoir capacity.
- **Agriculture:** Topsoil depletion, decreased soil fertility, and reduced crop productivity.
- **Utilities and Lifelines:** Undermining or exposure of buried utilities, erosion around bridge foundations, and damage to drainage structures.
- **Environmental Resources:** Increased turbidity, nutrient loading, and loss of aquatic and riparian habitat quality.

Although erosion rarely presents a direct life-safety threat, the economic and environmental costs of unmanaged erosion can be substantial—particularly for infrastructure and water resources. Maintenance, dredging, and repair costs are likely to rise as runoff intensity and sediment loads increase.

Table 21: Summary of Future Risk Factors

Factor	Effect on Erosion Risk
Climate variability	More intense storms and rain-on-snow events increase runoff and slope erosion.
Development pressure	New grading and construction disturb soils and alter natural drainage, increasing sediment loads.
Wildfire and vegetation change	Loss of vegetation due to fire or drought exposes soils to rainfall and wind erosion.
Agricultural practices	Overgrazing and irrigation inefficiency increase surface erosion and streambank instability.
Reservoir sedimentation	Continued soil loss reduces reservoir capacity and increases maintenance and dredging costs.

Extreme Cold

Hazard Definition

For hazard mitigation planning purposes in Morgan County, extreme cold events are specifically defined by sustained air temperatures at or below 0°F or wind-chill values at or below −20°F for multiple hours. Extremely cold temperatures often accompany a winter storm and can cause power outages and icy roads. Extreme cold is a dangerous situation that can bring on health emergencies in susceptible people, such as those without shelter, those who are stranded, or those who live in a home that is poorly insulated or without heat. Whenever temperatures drop decidedly below normal and wind speeds increase, heat can leave the body more rapidly. These weather-related conditions may lead to serious health problems.[63]

The National Weather Service (NWS) also states that a combination of brisk winds and cold air can result in extreme cold and dangerously cold wind-chill values. People exposed to extreme cold are susceptible to frostbite and hypothermia affecting uncovered skin and the extremities, such as hands and feet. Hypothermia occurs when the body loses heat faster than it can produce heat (see Figure 31).[64]

Figure 31: Frostbite and Hypothermia Actions[65]

Cold weather can also affect crops. In late spring or early fall, cold air outbreaks can damage or kill crops grown by farmers, as well as residential plants and flowers. A freeze occurs when the temperature drops below 32°F. Freezes and their effects are significant during the growing season. Frost develops on clear, calm nights and can occur when the air temperature is in the mid-30s. Each plant species has a different tolerance to cold temperatures.

[63] U.S. Centers for Disease Control and Prevention, "Extreme Cold: The Prevention Guide to Promote Your Personal Health and Safety," 2005, https://stacks.cdc.gov/view/cdc/5689.
[64] National Weather Service, "Cold Weather Safety," 2025, https://www.weather.gov/safety/cold.
[65] National Weather Service, "Cold Weather Safety," 2025, https://www.weather.gov/safety/cold.

Extreme cold in Morgan County occurs when air temperatures fall to 0°F or below, or when wind-chill values reach −20°F or lower for multiple hours. The county's mountain-valley topography promotes cold-air pooling and temperature inversions, often resulting in localized pockets of much colder air in canyon bottoms and valley floors. Associated impacts include burst water lines, increased heating energy demand, icing on transportation corridors, and potential power supply interruptions.

Geographic Location

All of Morgan County is susceptible to extreme cold; however, the greatest frequency and duration of sub-zero events occur on the valley floors along the Weber River and in the high-elevation benches of the Wasatch Back (see Table 22, which uses Tmin to indicate minimum temperature). Temperature inversions can trap cold air for days in the Morgan Valley, creating prolonged periods of freezing fog and poor air quality. Jurisdiction-specific cold pool mapping and sheltering capacities are provided in the annexes.

Table 22: Typical Coldest Temperatures and Cold-Pool Behavior by Terrain Zone in Morgan County

Terrain Zone	Typical Tmin (°F) on Coldest Nights	Cold-Pool Persistence	Example Areas
Valley floors (4,800–5,100 ft)	−10 to −20	Multiday inversions	Morgan City, Peterson
Canyon benches (5,200–5,800 ft)	−5 to −15	Short duration	Mountain Green
High ridges (>6,000 ft)	−5 to −10	Exposed, windy	East Canyon area

CODE BLUE ALERTS

A 2023 Utah law, Code Blue Alerts, authorizes counties to issue Code Blue Alerts when temperatures in specific areas are expected to drop to 18°F (including wind chill) for two hours or more within a 24-hour period. The alert allows shelters to relax and expand their operations, giving officials greater flexibility to identify new locations to shield people who are experiencing homelessness from the cold.[66]

Magnitude and Severity

Beginning in 2023 and continuing through 2024, the National Oceanic and Atmospheric Administration's (NOAA) NWS, as part of its ongoing Hazard Simplification initiative, updated its cold weather alert system, streamlining and clarifying messaging around dangerous cold weather conditions, in an effort to make alerts more understandable for the public and decision-makers alike. The following are the new terms used to describe extreme cold conditions, which rename key cold-weather alerts and consolidate similar

[66] Utah Department of Health and Human Services, "What Is a Code Blue Alert?," 2025, https://dhhs.utah.gov/code-blue-utah/.

warnings (see Figure 32). These terms help to explain the magnitude and severity of extreme cold, which can cause frostbite and hypothermia in just minutes.[67]

- **Extreme Cold Warning:** Issued when extremely dangerous cold conditions or wind chill values are expected or occurring. If you are in an area with an Extreme Cold Warning, avoid going outside. If you must go outside, dress in layers, cover exposed skin, and make sure at least one other person knows your whereabouts. Notify them when you arrive safely at your destination.
- **Extreme Cold Watch:** Issued when extremely dangerous cold conditions or wind chill values are possible, but the occurrence, location, and/or timing are still uncertain. As with a Warning, adjust your plans to avoid being outside during the coldest parts of the day. Make sure your car has at least half a tank of gas, and check or update your winter survival kit.
- **Cold Weather Advisory:** Issued for dangerously cold conditions that are not expected to reach warning criteria. Be sure you and your loved ones dress appropriately and cover exposed skin when venturing outdoors.

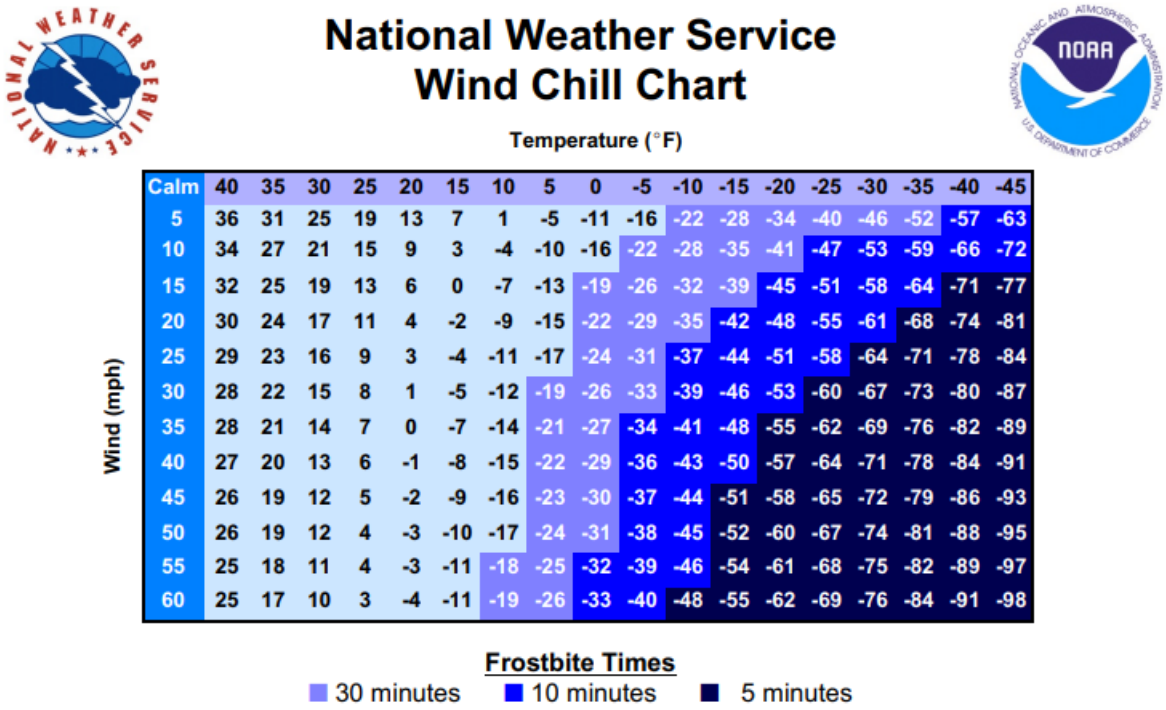
Figure 32: National Weather Service's Extreme Cold Watch and Warning[68]

WIND CHILL

Wind Chill is the rate of heat loss from the human body resulting from exposure to low temperatures and wind. An increase in wind speed carries heat away from the body at a faster rate, which lowers both the skin temperature and, eventually, the internal body temperature. Animals are also affected by wind chill.

[67] The Next Summit, "Say Goodbye to Windchill Alerts: NOAA's New Cold Warning Explained," 2024, https://thenextsummit.org/say-goodbye-to-wind-chill-alerts-noaas-new-cold-warnings-explained/.
[68] National Weather Service, "Cold Weather Safety," 2025, https://www.weather.gov/safety/cold.

Figure 33 shows the NWS Windchill Chart used to check wind chill based on the wind speed and temperature. The shaded areas show how long it will take for exposed skin to become frostbitten. Figure 34 provides frostbite times based on wind speed and temperature. It indicates that a wind chill of −20°F can cause frostbite in just 30 minutes.

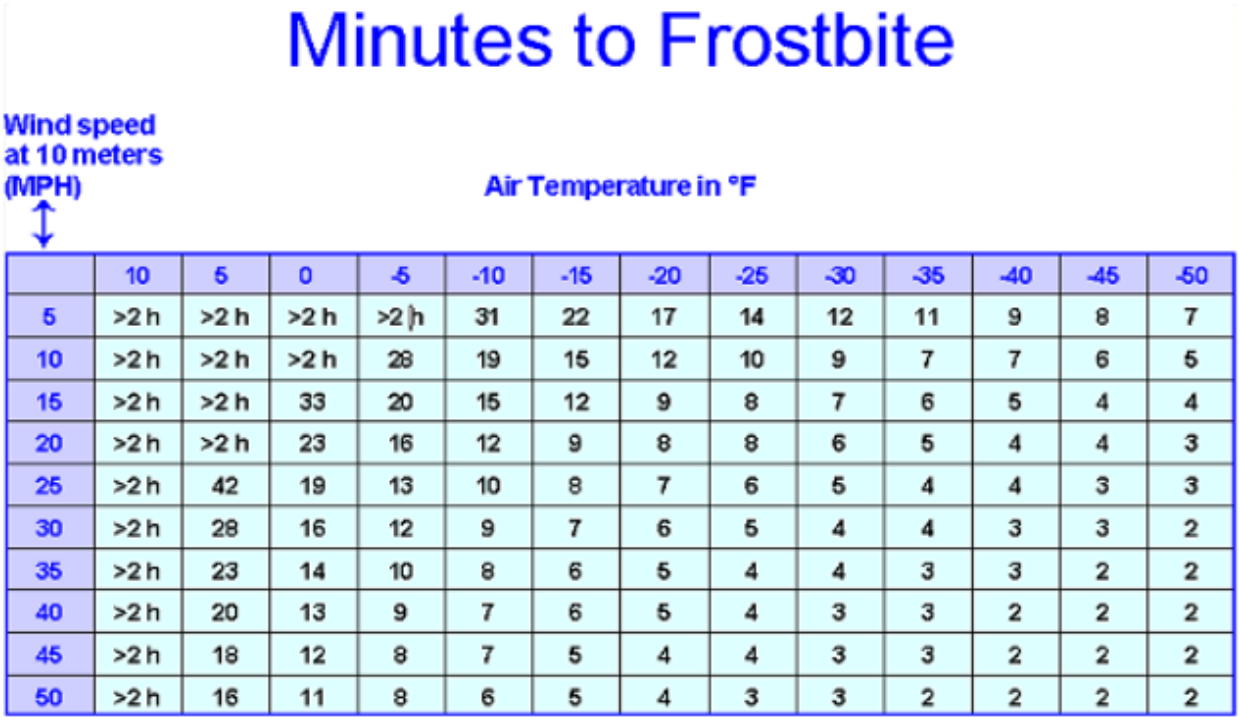


Wind (mph)	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5		36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10		34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15		32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20		30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25		29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30		28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35		28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40		27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45		26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50		26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55		25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60		25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Figure 33: National Weather Service Windchill Chart[69]

For operational planning purposes consistent with NWS guidance, events producing minimum wind-chill values between −20°F and −30°F are considered "Severe Cold," while wind chills below –40°F are considered "Extreme Cold." These thresholds guide Code Blue shelter activations.

[69] National Weather Service, "National Weather Service Wind Chill Chart," n.d., https://www.weather.gov/media/unr/windchill.pdf.



	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50
5	>2 h	>2 h	>2 h	>2 h	31	22	17	14	12	11	9	8	7
10	>2 h	>2 h	>2 h	28	19	15	12	10	9	7	7	6	5
15	>2 h	>2 h	33	20	15	12	9	8	7	6	5	4	4
20	>2 h	>2 h	23	16	12	9	8	8	6	5	4	4	3
25	>2 h	42	19	13	10	8	7	6	5	4	4	3	3
30	>2 h	28	16	12	9	7	6	5	4	4	3	3	2
35	>2 h	23	14	10	8	6	5	4	4	3	3	2	2
40	>2 h	20	13	9	7	6	5	4	3	3	2	2	2
45	>2 h	18	12	8	7	5	4	4	3	3	2	2	2
50	>2 h	16	11	8	6	5	4	3	3	2	2	2	2

Figure 34: Frostbite Onset Chart[70]

Historical Occurrences

From 2000 through 2025, Morgan County experienced at least 10 multiday cold spells with minimum temperatures (Tmin) at or below −10°F.

Table 23: Selected Multiday Cold Spells in Morgan County, 2000–2025

Date	Tmin	Duration	Local Impacts
January 2003	–21°F (Morgan Valley)	3 days	Frozen water lines; school delays
December 2013	–19°F	2 days	Increased gas demand; livestock losses
January 2017	–17°F (–32°F wind chill)	4 days	Pipe breaks; Code Blue activation
February 2021	–15°F	3 days	Utility strain; burst residential pipes

The NOAA's National Centers for Environmental Information (NCEI) Storm Events Database recorded one incident of extreme cold/wind chill for Morgan County (Wasatch Mountain Valleys, Wasatch Mountains I-80 North, Wasatch Back, Wasatch Mountains I-80 North) between 2000 and 2025. This reflects the limited classification of cold events within the NCEI Storm Events Database and does not capture all locally observed or operationally significant cold spells documented through local records and climatological data.

[70] National Weather Service, "Minutes to Frostbite Chart," 2025, https://www.weather.gov/dlh/extremecold.

On March 26, 2005, very cold air behind a departing winter storm allowed temperatures to plunge to record levels for most of Morgan County.[71] The State of Utah's Enhanced Hazard Mitigation Plan states that the March 26, 2005, wind-chill event impacted temperatures statewide; however, there was no property or crop damage.[72]

Figure 35 shows the Utah Department of Natural Resources, Division of Water Resources' 2020 report on the number of very cold nights in a time series from 1900 to 2020. The figure presents the observed number of extremely cold days with minimum temperatures below 0°F. A black horizontal line indicates the average in the panel.[73]

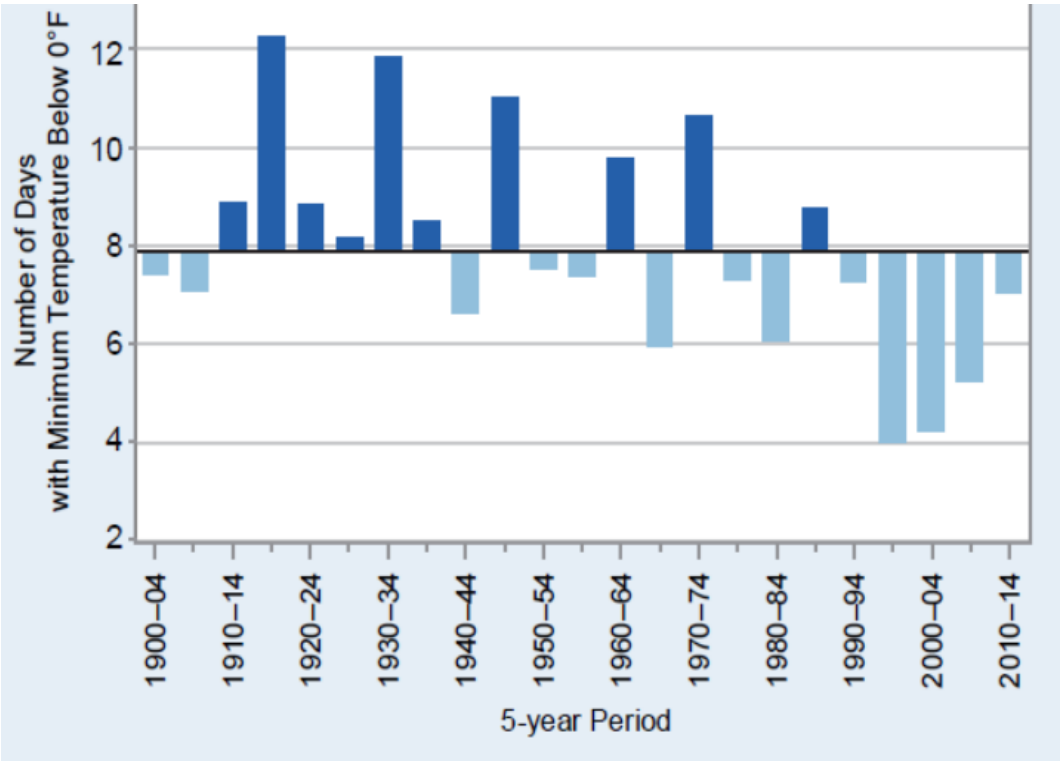


Figure 35: Utah Observed Number of Very Cold Nights Time Series, 1900–2020[74]

[71] National Weather Service, National Centers for Environmental Information, "Morgan County Cold/Wind Chill, Extreme Cold/Wind Chill, 2000–2025," 2025, https://www.ncei.noaa.gov/stormevents/listevents.jsp?eventType=%28Z%29+Cold%2FWind+Chill&eventType=%28Z%29+Extreme+Cold%2FWind+Chill&beginDate_mm=01&beginDate_dd=01&beginDate_yyyy=2000&endDate_mm=10&endDate_dd=01&endDate_yyyy=2025&county=MORGAN%3A29&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=49%2CUTAH.

[72] Utah Enhanced State Hazard Mitigation Plan, "Chapter 4: Severe Weather–Utah Major Windchill Events, 1996–2022," https://hazards.utah.gov/wp-content/uploads/SevereWeatherChapterHMP.pdf.

[73] Utah Department of Natural Resources, Division of Water Resources, "Climate Change, Water Resources, and Potential Adaptation Strategies in Utah," 2020, https://water.utah.gov/wp-content/uploads/2020/11/Finaldraft_ClimateChangeUtah__March2020.pdf.

[74] Utah Department of Natural Resources, Division of Water Resources, "Climate Change, Water Resources, and Potential Adaptation Strategies in Utah," 2020, https://water.utah.gov/wp-content/uploads/2020/11/Finaldraft_ClimateChangeUtah__March2020.pdf.

Figure 36 presents the Utah Climate Center's freezing temperature table, which provides the dates of the last spring and first fall freezes (0°C or lower) at the Morgan Weather Station. These values are based on years with sufficient minimum temperature data to support reliable calculations.[75]

Morgan Freeze Details

Station Name	Station ID	Latitude	Longitude	Country	State	Period	Years
MORGAN	USC00425826	41.0575	-111.6894	United States	Utah	1903-2025	98

Last spring freeze					
Early	Early Year	Avg	Median	Late	Late Year
27-Apr	1998	06-Jun	03-Jun	24-Jul	1954

First fall freeze					
Early	Early Year	Avg	Median	Late	Late Year
29-Jul	1948	11-Sep	12-Sep	14-Oct	1963

Freeze-free Season					
Short	Short Year	Avg	Median	Long	Long Year
23	1954	97.1	100.5	160	1998

Figure 36: Freezing Temperature Table for Morgan County[76]

STATE AND FEDERAL DISASTER DECLARATIONS

A review of the FEMA Disaster Declarations Database indicates that Morgan County has not received a federal major disaster declaration specifically attributed to extreme cold or cold-wave conditions since the previous Morgan County Hazard Mitigation Plan update. Similarly, the State of Utah has not issued a state disaster declaration specifically for extreme cold impacts affecting Morgan County during this period.

Although severe winter weather events occasionally affect northern Utah and may contribute to regional emergency declarations related to winter storms, no state or federal disaster declarations have been issued specifically for extreme cold events in Morgan County since the last plan update.

Probability and Effects of Future Conditions

Based on historical climatological records and winter temperature observations for northern Utah, the probability of extreme cold events affecting Morgan County within the next five years is considered Likely. Historical data from the Utah Climate Center indicate that Morgan County experiences approximately three to five days each winter with minimum temperatures at or below −10°F, demonstrating that extreme cold conditions occur regularly during the winter season.

[75] Utah Climate Center, "Utah Freeze Dates-Morgan Weather Station (1903–2025)," 2025, https://climate.usu.edu/reports/freezeDetails.php?station_id=1080052&ntwk=GHCN.
[76] Utah Climate Center, "Utah Freeze Dates-Morgan Weather Station (1903–2025)," 2025, https://climate.usu.edu/reports/freezeDetails.php?station_id=1080052&ntwk=GHCN.

These cold events are most common from December through February, when valley inversions and Arctic air outbreaks combine to produce prolonged cold-pool conditions. Although the total number of cold days across northern Utah is projected to gradually decrease due to regional warming trends, climate models suggest an increase in short-duration but more intense cold outbreaks, particularly those driven by Arctic air intrusions.

County emergency management staff and partners track several indicators to monitor winter severity and guide preparedness actions, including the following:

- The number of days with minimum air temperatures at or below 0°F
- The number of days with wind-chill values at or below −20°F
- The number of Code Blue shelter activations for residents requiring temporary warming assistance

According to the Utah State Enhanced Hazard Mitigation Plan, Utah's coldest recorded temperature is −69°F. Subzero and below-freezing temperatures continue to occur statewide on a near-annual basis. Within this context, Morgan County's National Risk Index (NRI) score classifies its cold-wave risk as "Relatively Low," reflecting moderate exposure and relatively high community resilience. The NRI records an annualized frequency of 0.2 cold-wave events per year, with three documented events between 2005 and 2021—consistent with local and state climatological observations.

Figure 37 illustrates the National Risk Index cold-wave risk for Morgan County and neighboring counties, showing generally low to moderate risk levels across the Wasatch Front region. Figure 38 presents the average daily maximum temperatures observed and projected for Morgan County from 2010 through 2040. The line graph demonstrates that the county typically experiences the lowest daytime temperatures in December, January, and February, averaging near or slightly above 30°F, a pattern typical of northern Utah's high-elevation valleys.

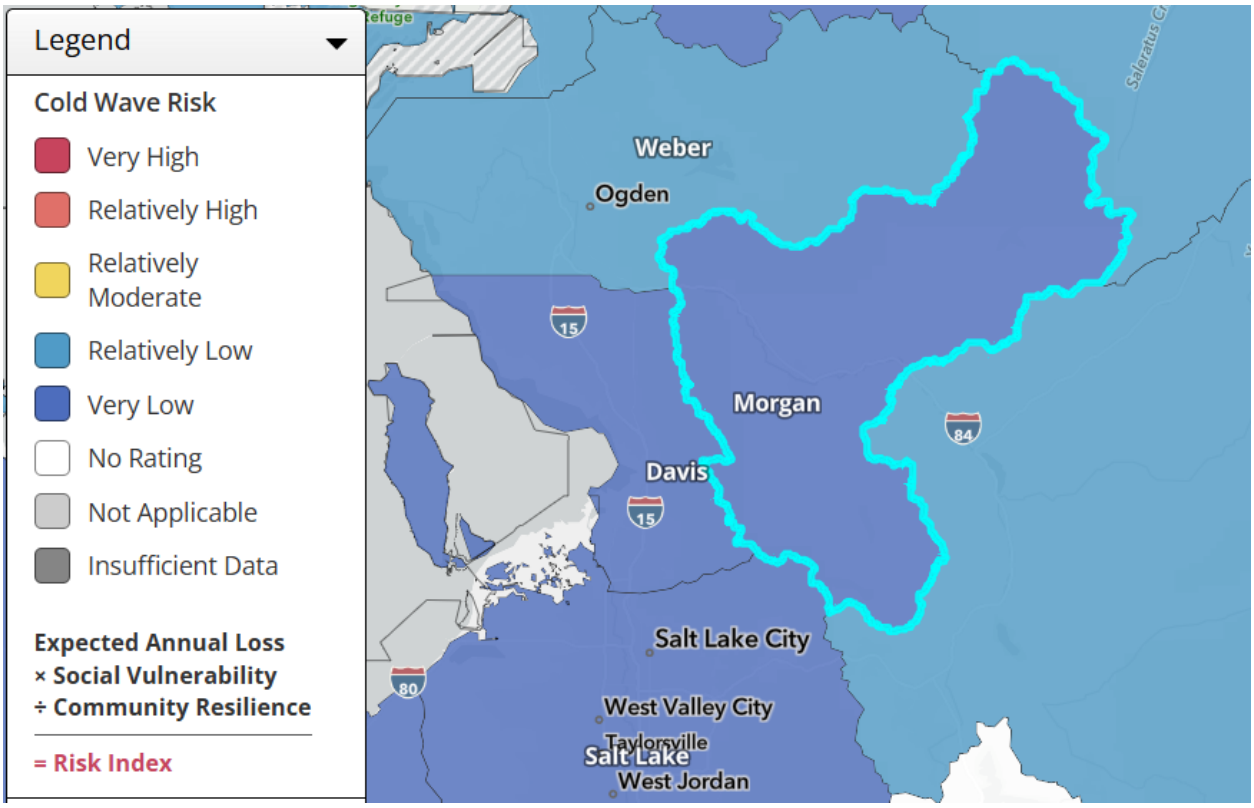


Figure 37: National Risk Index Map of Cold-Wave Risk for Morgan County and Surrounding Counties[77]

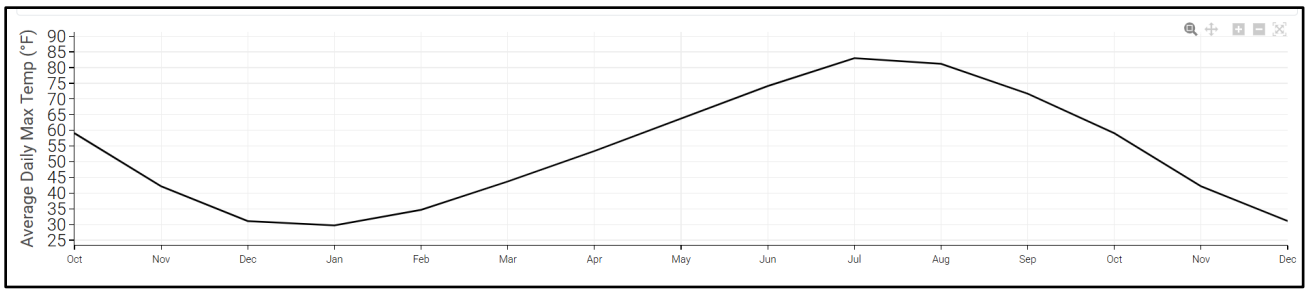


Figure 38: Morgan County Average Daily Maximum Temperatures Observed and Projected, 2010–2040[78]

While gradual warming trends may shorten the duration of extreme cold spells, these events will continue to pose significant risks to vulnerable populations, critical infrastructure, and utilities. Power outages, frozen water systems, and transportation disruptions remain likely during severe cold events.

[77] Federal Emergency Management Agency, National Risk Index, "Cold Wave Risk Map and Legend–Morgan County and Surrounding Counties," 2025, https://hazards.fema.gov/nri/map#.

[78] Western Water Assessment, Utah Hazard Planning Dashboard, "The Climate Explorer-Morgan County, Utah, 2010–2040)," https://crt-climate-explorer.nemac.org/climate_graphs/?city=Morgan%2C+UT&county=Morgan+County&area-id=49029&fips=49029&zoom=7&lat=41.04&lon=-111.68&mode=daily_vs_climate&station=USC00422385&station-name=ECHO+DAM.

Flood

Hazard Definition

Flooding is one of the most common natural hazards in Morgan County, occurring when water overflows or accumulates on land that is normally dry. Floods can result from a variety of natural and human factors, including intense precipitation, rapid snowmelt, rain-on-snow events, ice or debris jams, and localized drainage limitations in developed areas. While flooding occurs in most years, the scale and impacts vary greatly across the county depending on elevation, watershed characteristics, soil saturation, and development density.

Morgan County's flood risk is shaped by its topography and climate. The county's steep canyon headwaters and confined valleys collect runoff rapidly, while the valley floor - occupied by the Weber River and its tributaries - forms a natural floodplain. The Wasatch Range to the west and the Uinta Mountains to the east influence precipitation patterns, with annual snowfall exceeding 60 inches in valley locations and 100 inches or more at higher elevations. The conditions under which flooding most often occurs:

- **Spring Snowmelt:** when warming temperatures rapidly melt deep snowpack
- **Late Winter or Early Spring Rain-on-Snow Events:** which accelerate runoff and increase river stage
- **Summer Cloudbursts:** which generate short-lived but intense flash flooding and debris flows in steep basins

Ice jams occasionally occur along the Weber River during freeze–thaw cycles, temporarily damming flow and increasing upstream water levels. In recent years, wildfires in the Wasatch foothills and East Canyon area have increased the potential for post-fire debris flows, a combined hazard involving flooding and landslide processes.

FEMA defines a floodplain as any land area susceptible to being inundated by floodwaters from any source. The Special Flood Hazard Area (SFHA), mapped by FEMA through the National Flood Insurance Program (NFIP), represents the area subject to a 1% annual chance of flooding. This 1% annual chance event is also called the "base flood." These areas are shown on Flood Insurance Rate Maps (FIRMs). Morgan County currently participates in the NFIP, and flood hazard zones are identified throughout the incorporated and unincorporated areas of the county[79].

[79] Federal Emergency Management Agency, "FEMA Flood Map Service Center," 2026, https://msc.fema.gov/

Morgan County experiences three primary types of flooding:

- **Riverine Flooding:** Occurs when stream channels overflow their banks due to sustained runoff from rainfall or snowmelt. This is most common along the Weber River, East Canyon Creek, Lost Creek, and Hardscrabble Creek, particularly during the spring melt season (April–June). Riverine flooding produces gradual inundation but can persist for days, threatening homes, roads, bridges, and agricultural lands adjacent to the floodplain.
- **Flash Flooding:** Rapid-onset flooding triggered by short-duration, high-intensity rainfall in steep terrain. Flash floods are most likely in Weber Canyon, Lost Canyon, Hardscrabble Canyon, and other mountain drainages where runoff concentrates in narrow channels. These events may develop with little warning, producing high velocities (often >10 feet per second) and depths capable of scouring streambanks, washing out culverts, and depositing debris on roadways. Flash flooding risk increases sharply in post-wildfire areas, where hydrophobic soils reduce infiltration.
- **Localized (Urban or Shallow) Flooding:** Typically results from blocked or undersized storm drains, inadequate culverts, or overland flow across impervious surfaces. As development expands in Mountain Green, Milton, and Morgan City, areas outside mapped floodplains increasingly experience temporary ponding or shallow flooding (usually less than one foot in depth). Though often short-lived, these events can still cause property damage, impede access, and strain local response resources.

Geographic Location

Flood hazards in Morgan County are geographically widespread but vary significantly in type and severity depending on topography, hydrology, land use, and the adequacy of drainage infrastructure. Flooding most often occurs along rivers and streams, in low-lying agricultural lands, canyon drainages, and areas with limited stormwater conveyance capacity. Key watersheds of concern include the Weber River, East Canyon Creek, Lost Creek, and Hardscrabble Creek.

COUNTYWIDE CONTEXT

The Weber River Basin is the dominant hydrologic system in Morgan County, flowing westward from Echo Reservoir through Morgan City, Milton, and Peterson, before entering Weber Canyon. The river receives runoff from extensive snowmelt and tributaries draining the Wasatch Mountains and Uinta foothills, resulting in high streamflows during spring and early summer. Riverine flooding is the primary concern along the Weber River corridor, where water routinely approaches or exceeds bankfull levels, affecting residential, agricultural, and transportation areas adjacent to the channel.

Flash flooding is most common in the steep, narrow canyons of unincorporated areas, especially where wildfire burn scars, hydrophobic soils, or limited vegetation recovery accelerate runoff. Late summer convective storms can trigger rapid, debris-laden flows that cause significant erosion and damage to roads, culverts, and irrigation systems. Canyons with the highest susceptibility include Lost Canyon, Dry

Hollow, East Canyon, and Hardscrabble Creek, each exhibiting unique characteristics that influence local flood behavior:

- Lost Canyon, which drains into the Weber River near Croydon, is steep and confined, producing rapid concentration of runoff. Flows above Lost Creek Reservoir and through downstream constrictions pose recurring flash-flood potential during high-intensity storms.
- Dry Hollow, east of Mountain Green, has a short but steep gradient with limited natural detention, leading to fast, high-energy runoff even during moderate rainfall.
- East Canyon, a larger and partially developed watershed that carries East Canyon Creek toward Morgan City, experiences accelerated flows in its upper reaches and confined sections where channel capacity limits overbank spread.
- Hardscrabble Creek Canyon, south of Morgan City, combines steep slopes and narrow channels. Under post-fire or frozen-soil conditions, runoff can rapidly descend toward agricultural lands and urban fringes along the lower Weber corridor.

In rapidly developing areas such as Mountain Green and portions of Morgan City, localized shallow flooding also occurs where stormwater systems are undersized or obstructed by debris. Channel constrictions, culvert limitations, and concentrated urban runoff can lead to temporary street ponding and basement flooding during cloudburst events.

In the absence of adequate stormwater infrastructure, localized shallow flooding is also a concern in rapidly developing communities such as Mountain Green and areas of Morgan City. Channel constrictions, undersized culverts, debris obstructions, and urban runoff patterns can exacerbate flooding in these urbanizing zones.

JURISDICTION-SPECIFIC NUANCES

- **Morgan City:** Located along the Weber River floodplain, Morgan City is vulnerable to riverine flooding, particularly near older infrastructure and roadways adjacent to the river. Channel encroachment and urbanization increase localized flood risk.
- **Mountain Green (Unincorporated):** Rapid residential and mixed-use development has led to increased impervious surface coverage and modified drainage pathways. Flash flooding in steep tributary drainages and localized ponding in poorly drained zones are growing concerns. Wildfire burn scars in adjacent foothills elevate the risk of debris-laden flood events.
- **Milton, Enterprise, and Peterson:** These communities, located in low-lying areas adjacent to the Weber River and its tributaries, experience seasonal flooding risks, particularly during high snowpack years or spring rain-on-snow events. Floodwaters may overtop banks, inundate farmland, and damage rural infrastructure.
- **Porterville and Richville:** These agricultural communities are situated near natural drainage pathways and are vulnerable to overland flow and sheet flooding, especially during convective storm events. Limited structural flood protection infrastructure exists.

MAPPING AND DATA RESOURCES

Flood-prone areas are delineated on FEMA Flood Insurance Rate Maps (FIRMs), which identify Special Flood Hazard Areas (SFHAs) representing the 1% annual-chance (100-year) floodplain. The current effective FIRMs for Morgan County and Morgan City, dated December 7, 2017, remain the official regulatory standard for floodplain management and insurance purposes.

Additional sources supporting flood assessment include the Utah Division of Emergency Management Floodplain Mapping Program[80], U.S. Geological Survey (USGS) StreamStats, National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS) Advanced Hydrologic Prediction Service, and the National Water Model, which provides flood forecast simulations. While non-regulatory models (such as First Street Foundation's Risk Factor) can supplement awareness, the FIRMs remain the authoritative reference for planning and permitting. SFHAs for Morgan County are shown in Figure 39.

[80] Utah Division of Emergency Management, "Floodplain Mapping Program," 2026, https://floodhazards.utah.gov/mapping/

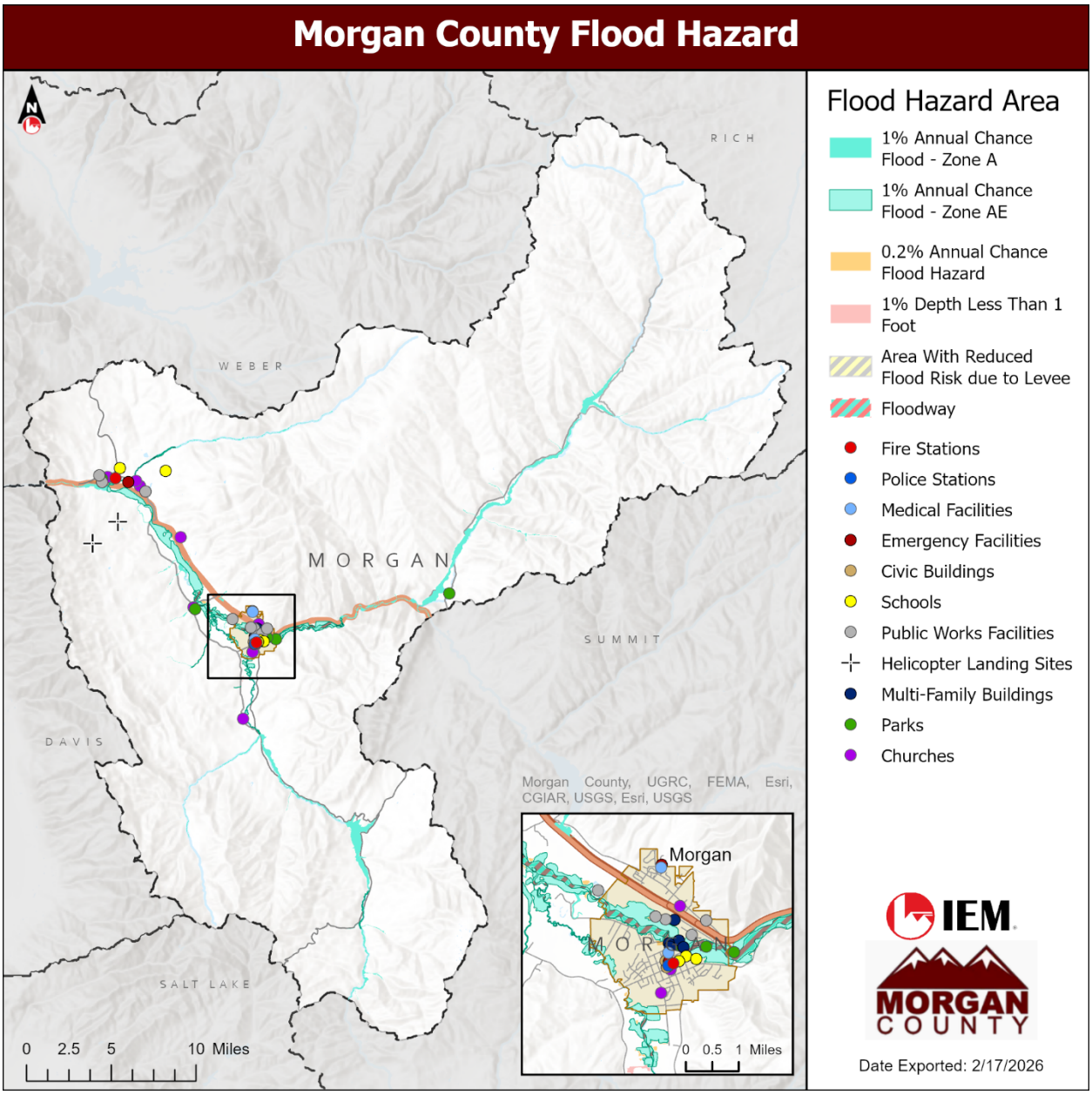


Figure 39: Morgan County Flood Hazard Areas

Magnitude and Severity

Flood magnitude and severity in Morgan County vary widely depending on the flood type, location, watershed conditions, and season. The most significant flooding results from prolonged snowmelt, rain-on-snow events, or intense rainfall on saturated soils and steep terrain. Riverine floods along the Weber River and its tributaries produce gradual but sustained inundation, while flash floods in canyon drainages develop rapidly and carry debris at high velocities.

RIVERINE FLOODING

Riverine flooding along the Weber River, East Canyon Creek, and Lost Creek typically occurs during April through June, when rapid snowmelt and warm rainfall elevate river levels. During these events, river depths within flood-prone areas may rise three to six feet above normal stage, producing floodwaters that extend several hundred feet beyond the active channel in low-lying valley sections. Average flow velocities in overbank areas range from 4 to 8 feet per second, sufficient to damage foundations, erode streambanks, and threaten public safety.

USGS maintains two long-term stream gauges along the Weber River:

- Weber River at Morgan (USGS 10133550)
- Weber River near Gateway (USGS 10136000)

Both record peak discharges exceeding 5,000 cubic feet per second (cfs) during major runoff years, with minor flooding beginning near 3,500 cfs.[81]. Historical data show that the 2011 and 2023 spring events reached or exceeded action stage, producing minor overbank flooding in portions of Morgan City, Milton, and Peterson.

In extreme cases, such as the 1983–1984 statewide floods and the 2023 spring high-water period (FEMA DR-4752), saturated soils combined with rapid melt and intense rain have led to sustained high flows, overtopped banks, and damage to local roads, bridges, and farmland. Although large-scale inundation is infrequent, moderate flooding recurs on a 5- to 10-year cycle, requiring repeated cleanup and repair of culverts, embankments, and irrigation systems.

FLASH FLOODING

Flash floods occur primarily in steep, confined canyons and fan areas such as Lost Canyon, Dry Hollow, East Canyon, and Hardscrabble Creek. These events are typically triggered by short-duration thunderstorms producing 1 to 2 inches of rainfall per hour. Runoff velocities may exceed 10 feet per second, and water depths can rise from inches to several feet within minutes. Debris flows, rock, and sediment transported by these floods often clog culverts and road crossings, resulting in localized washouts and temporary isolation of rural properties.

Flash-flood impacts are most severe where post-wildfire burn scars or thin soils increase runoff potential. The combination of steep gradients and limited channel storage means that even moderate storms can produce damaging surges. While these floods are short-lived, they can disrupt transportation on SR-66, SR-167, and canyon access roads, requiring hours to days of debris removal and repair.

[81] U.S. Geological Survey, "Weber River at Morgan, UT (USGS 10133550)," 2026, https://waterdata.usgs.gov/monitoring-location/10133550/

LOCALIZED (URBAN) FLOODING

Localized or shallow flooding occurs throughout Morgan City and Mountain Green, where undersized or obstructed storm drains limit conveyance capacity during cloudbursts. Flood depths are typically less than one foot, but ponding can affect homes, basements, and road intersections. Repeated nuisance flooding in these areas has prompted ongoing improvements to stormwater systems and culvert maintenance programs.

OVERALL SEVERITY AND FUNCTIONAL IMPACTS

Although large-scale catastrophic flooding is rare in Morgan County, even moderate-magnitude events can have outsized operational and economic effects.

- Transportation corridors - particularly Interstate 84 and State Routes 66 and 167 - are vulnerable to closure from water overtop, debris, or bank erosion.
- Agricultural areas experience crop losses, sediment deposition, and irrigation-ditch damage following flood events.
- Utility lines, bridges, and culverts require frequent maintenance after moderate runoff years.
- Localized flooding disrupts access to schools and emergency routes, straining County Public Works and first responders.

Table 24: Flood Severity and Impacts

Flood Type	Typical Depth/ Velocity	Severity	Recurrence	Representative Impacts
Riverine (Weber River/tributaries)	3–6 ft / 4–8 fps	Moderate–Severe	Every 5–10 years	Overbank flooding of farmland, roads, basements
Flash Flood (canyons, fans)	1–3 ft + / 8–12 fps	Severe–Extreme	2–3 events per decade	Debris flows, culvert failure, road washouts
Localized (urban/ drainage)	< 1 ft / 1–3 fps	Minor–Moderate	Several times per year	Street ponding, basement flooding, minor property damage

Overall, flood hazard magnitude in Morgan County is classified as High, and severity ranges from Moderate to Severe, depending on the event type and hydrologic conditions. The county's topography, snow-dominant climate, and increasing development in drainage areas ensure that flooding remains one of the most frequent and economically disruptive natural hazards in the region.

Historical Occurrences

Flooding has affected Morgan County regularly throughout its history, most often during spring snowmelt and heavy rain-on-snow events. While most incidents have been localized and short in duration, a few have produced widespread effects, damaging infrastructure, agricultural lands, and transportation routes. The historical record indicates that moderate flooding occurs on a 5- to 10-year cycle, with smaller nuisance events happening nearly every year.

OVERVIEW OF RECORDED EVENTS

According to the National Centers for Environmental Information (NCEI) Storm Events Database, USGS stream gauge data, and Utah Division of Emergency Management reports, Morgan County has experienced multiple notable flood events since 1983. These include large-scale regional floods as well as localized canyon and flash-flood events. The Weber River, East Canyon Creek, and Lost Creek are the most frequently impacted watercourses, although flooding also occurs along smaller drainages and within developed areas such as Mountain Green and Morgan City.

Table 25: Representative Flood Events in Morgan County, 1983–2025z

Date/Period	Location/Type	Description and Impacts	Source
Spring–Summer 1983–1984	Countywide (Weber River, tributaries)	Prolonged statewide flooding from record snowpack and rapid snowmelt. Minor inundation along the Weber River; rural roads and irrigation infrastructure sustained damage.	Utah DEM, USGS
May–June 2011	Weber River and tributaries	High flows from heavy late spring precipitation and snowmelt. Water approached bankfull near Morgan City; minor flooding reported in agricultural areas; several culverts overtopped.	NCEI, USGS
September 2013	Lost Canyon/ Hardscrabble drainages	Intense convective thunderstorms caused debris-laden flash floods, temporarily closing canyon roads and washing out minor culverts.	NCEI
Spring 2017	Weber River corridor	Above-average snowpack led to sustained high flows in April and May; isolated flooding in low-lying farmland and along SR-66.	Utah DEM
April–May 2023	Countywide	Record-breaking snowpack and rapid melt produced widespread flooding. Culverts overtopped and small bridges damaged in Milton and Peterson; Morgan City reported riverbank erosion and basement flooding. County included in FEMA Major Disaster Declaration DR-4752-UT (December 2023) for public assistance related to flood impacts.	FEMA, USGS, Utah DEM
Summer 2024	East Canyon/ Hardscrabble	Localized flash flooding and debris flows following thunderstorms on burn-affected slopes; no structural losses, but temporary closures on county roads.	UGS, NCEI

TRENDS AND OBSERVATIONS

- **Frequency:** Localized flooding occurs annually, while countywide high-water events recur approximately every 5 to 10 years.
- **Seasonality:** The majority of floods occur during spring melt (April–June), with secondary peaks in late summer from convective storms.
- **Primary Impacts:** Road and culvert washouts, bank erosion, bridge scour, irrigation ditch damage, and isolated property flooding are the most common losses.
- **Recent Patterns:** The 2023 event underscored the influence of record snowpack, rain-on-snow, and rapid warming, while 2024 highlighted increased risk of post-wildfire debris-laden flows in canyon drainages.

Although Morgan County has historically avoided catastrophic flood losses, the cumulative cost of recurring moderate events - particularly those requiring cleanup of roads, culverts, and public infrastructure - represents a consistent operational burden. These events also reveal the county's ongoing exposure along the Weber River corridor and at the canyon mouths, where steep topography and development proximity limit floodplain storage.

STATE AND FEDERAL DISASTER DECLARATIONS

Since the previous Morgan County Hazard Mitigation Plan update, Morgan County has received one federal major disaster declaration related to flooding. In December 2023, the county was included in FEMA Major Disaster Declaration DR-4752-UT, issued in response to statewide flooding caused by record snowpack, rapid snowmelt, and rain-on-snow events during the spring of 2023. The declaration made Public Assistance funding available for debris removal and repair of damaged public infrastructure.

Aside from the 2023 declaration, no additional federal major disaster declarations specifically associated with flooding have been issued for Morgan County since the last plan update. The State of Utah has periodically issued emergency proclamations related to spring runoff and flooding conditions in northern Utah; however, no additional state disaster declarations specific to flooding impacts in Morgan County have occurred during this period.

Probability and Effects of Future Conditions

Based on historical records and hydrologic monitoring data, the probability of flooding in Morgan County within the next five years is considered Likely. Historical observations show that localized flooding occurs in some portion of the county nearly every year, while larger riverine flood events affecting the Weber River corridor recur approximately every 5 to 10 years.

PROJECTED FREQUENCY AND SEVERITY

Hydrologic records from USGS and climate analyses by the Utah Climate Center and Fifth National Climate Assessment indicate that Northern Utah will experience more intense precipitation events, higher winter and spring temperatures, and earlier snowmelt[82]. These shifts are expected to increase the likelihood of both spring riverine flooding and late summer flash flooding, particularly in steep drainages and post-wildfire areas.

- Annual to 5-year floods are expected to continue affecting roads, culverts, and farmland along the Weber River and East Canyon Creek.
- Ten- to twenty-five-year floods could become more frequent, especially during combined rain-on-snow events when warm storms rapidly melt existing snowpack.
- Flash floods in small canyons (Lost, Hardscrabble, and Dry Hollow) may increase in both frequency and sediment load due to wildfire burn scars and more intense rainfall bursts.

CLIMATE CHANGE INFLUENCES

Regional climate projections show that by mid-century, average annual precipitation may remain similar, but extreme rain events will become more intense and concentrated over shorter durations[83]. Warmer winters will increase the number of rain-on-snow days, accelerating runoff and elevating flood peaks in late winter and early spring. Key hydrologic shifts expected to influence flood risk include the following:

- **Earlier and Faster Snowmelt:** producing higher spring runoff rates[84]
- **More Frequent Rain-on-Snow Events:** particularly below 7,000 feet elevation
- **Increased Precipitation Intensity:** even if total annual precipitation changes little
- **Extended Drought-to-Deluge Cycles:** which dry and compact soils, reducing infiltration and heightening runoff during storms

These combined factors are likely to increase flood magnitude and unpredictability.

POST-WILDFIRE AND DEBRIS FLOW EFFECTS

As wildfire frequency and size increase across Northern Utah, more slopes in Morgan County may experience burn-related hydrologic changes. Burn scars in the East Canyon, Hardscrabble, and Lost Creek watersheds will remain vulnerable to flash flooding and debris flows for 3 to 5 years following major fires. Sediment and debris transported from burned areas can reduce channel and culvert capacity, leading to

[82] U.S. Global Change Research Program, "Fifth National Climate Assessment", 2023, https://www.globalchange.gov/nca5
[83] NOAA National Centers for Environmental Information, "Utah State Climate Summary," 2022, https://statesummaries.ncics.org/chapter/ut/
[84] Utah Division of Water Resources, "Climate Change, Water Resources, and Potential Adaptation Strategies in Utah," 2020, https://water.utah.gov/wp-content/uploads/2020/09/Final-Report_ClimateChangeUtah_May_2020.pdf

downstream flooding even during moderate rainfall. Integration of post-fire slope monitoring and early warning protocols will be critical for managing this compounding hazard.

DEVELOPMENT AND LAND-USE CHANGE

Continued residential and commercial growth in Mountain Green, Milton, and along the Weber River corridor increases both exposure and runoff potential. Expanding impervious surfaces - such as roads, roofs, and parking areas - reduce natural infiltration and elevate peak discharge rates in small watersheds. Channel modifications, streambank encroachments, and stormwater conveyance limitations further amplify localized flooding. Without proactive design standards and floodplain management, these trends will increase the cost and frequency of flood-related infrastructure damage.

Table 26: Future Probability Assessment

Flood Type	Expected Change by 2050	Effect on Probability	Relative Confidence
Riverine (Weber River/ East Canyon)	Increased rain-on-snow, earlier melt	Moderate increase in frequency and severity	High
Flash Flood (Canyons/ Fans)	Higher precipitation intensity, post-fire effects	Significant increase in localized events	High
Localized/Urban Flooding	Continued development, limited stormwater upgrades	Increase in frequency and cost	High
Ice/Debris Jam	Warmer winters, variable freeze-thaw	Slightly reduced ice risk; higher debris risk	Moderate

Hail

Hazard Definition

Hail is a form of solid precipitation consisting of irregular pellets or balls of ice, each more than 5 millimeters (mm) in diameter, that fall from cumulonimbus clouds. Hail forms when strong, rising currents of air within a storm—called updrafts—carry water droplets upward to altitudes where they freeze. As the ice particles grow larger through repeated cycling within the storm, they become too heavy for the updraft to support and fall to the ground.

Morgan County experiences hail most frequently between April and September, typically during afternoon thunderstorms. While most hail events result in minimal damage, storms producing hailstones larger than 1 inch in diameter can cause significant damage to roofs, vehicles, and crops. Hail events are often accompanied by strong winds, lightning, and localized flash flooding.

Geographic Location

All areas of Morgan County are exposed to hail due to its location within Utah's convective storm corridor. Hail-producing thunderstorms most often develop along the Wasatch Mountains and move eastward through the Weber River Valley, affecting both populated and agricultural areas. The most frequent hail reports occur in and around Morgan City and the Mountain Green area, where storms exiting the canyons intensify due to orographic lifting (see Table 27). Jurisdiction-specific exposure and recent events are detailed in the annexes.

Table 27: Hail Exposure in Morgan County

Geographic Zone	Hail Frequency[85]	Typical Hail Size	Common Impacts
Weber River Valley	Infrequent, documented hail occurrences	Up to ~1.25 in (documented events)	Roof and vehicle damage; crop losses
Mountain Green Benchlands	Infrequent, documented hail occurrences	Up to ~1.25 in (documented events)	Vehicle and facility exposure
Upper Wasatch Slopes	Rare, documented hail occurrences	Generally <1.25 in (documented events)	Minimal structural exposure

Hail events affecting Morgan County are infrequent but documented in NOAA/NCEI Storm Events records and are typically associated with isolated convective thunderstorms during the late spring and summer months. While most events produce small hail with limited impacts, NOAA/NCEI records indicate that hailstones up to approximately 1.25 inches in diameter have occurred within Morgan County, posing localized risks to vehicles, roofing materials, and agricultural assets. At the county scale, the FEMA National Risk Index (NRI) characterizes Morgan County as having a low but non-zero annualized hail frequency, reflecting the relatively rare occurrence of damaging hail compared to high-risk regions such as the Great Plains, while confirming that hail remains a credible hazard for planning purposes.[86]

Magnitude and Severity

The Tornado and Storm Research Organization (TORRO) Hailstorm Intensity Scale extends from H0 to H10, with its increments of intensity or damage potential related to hail size (distribution and maximum), texture, number, fall speed, storm translation speed, and the strength of accompanying wind.[87] Table 28

[85] National Oceanic and Atmospheric Administration, National Centers for Environmental Information, "Storm Events Database, 1996–2024"; National Oceanic and Atmospheric Administration (NOAA), National Centers for Environmental Information (NCEI), "Storm Events Database – Event Details (Hail Event, Morgan County, Utah; Magnitude 1.25 inches)," 2026, https://www.ncei.noaa.gov/stormevents/eventdetails.jsp?id=10152848; Federal Emergency Management Agency (FEMA), "National Risk Index Data Methodology and Hazards Overview," 2025, https://www.fema.gov/sites/default/files/documents/fema_national-risk-index_methodology-hazards-overview.pdf; FEMA, "National Risk Index v1.20 Technical Documentation," 2025, https://www.fema.gov/sites/default/files/documents/fema_national-risk-index_technical-documentation.pdf.

[86] National Oceanic and Atmospheric Administration (NOAA), National Centers for Environmental Information (NCEI), "Storm Events Database – Event Details (Hail Event, Morgan County, Utah; Magnitude 1.25 inches)," 2026, https://www.ncei.noaa.gov/stormevents/eventdetails.jsp?id=10152848; Federal Emergency Management Agency (FEMA), "National Risk Index Data Methodology and Hazards Overview," 2025, https://www.fema.gov/sites/default/files/documents/fema_national-risk-index_methodology-hazards-overview.pdf; FEMA, "National Risk Index v1.20 Technical Documentation," 2025, https://www.fema.gov/sites/default/files/documents/fema_national-risk-index_technical-documentation.pdf.

[87] The Tornado and Storm Research Organization, "The TORRO Hailstorm Intensity Scale," 2025, https://www.torro.org.uk/research/hail/hscale.

summarizes The TORRO Hailstorm Intensity Scale (H0 to H10) in relation to typical damage and hail size categories.

Table 28: The H Scale[88]

Scale	Intensity Category	Typical Hail Diameter (mm)*	Probable Kinetic Energy (J/m^2)	Typical Damage Impacts
H0	Hard hail	5	0–20	No damage
H1	Potentially damaging	5–15	>20	Slight general damage to plants, crops
H2	Significant	10–20	>100	Significant damage to fruit, crops, vegetation
H3	Severe	20–30	>300	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
H4	Severe	25–40	>500	Widespread glass damage, vehicle bodywork damage
H5	Destructive	30–50	>800	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
H6	Destructive	40–60	—	Bodywork of grounded aircraft dented, brick walls pitted
H7	Destructive	50–75	—	Severe roof damage, risk of serious injuries
H8	Destructive	60–90	—	Severe damage to aircraft bodywork
H9	Super Hailstorms	75–100	—	Extensive structural damage. Risk of severe or even fatal injuries to people caught in the open
H10	Super Hailstorms	>100	—	Extensive structural damage. Risk of severe or even fatal injuries to people caught in the open

* Approximate range (typical maximum size in bold), since other factors (e.g., number and density of hailstones, hail fall speed and surface wind speeds) affect severity. Kinetic energy values are not shown for H6–H10 categories due to limited empirical measurements and increasing variability at extreme hail sizes.

Hailstones between 1.0 and 1.25 inches in diameter (TORRO H3–H4) are sufficient to damage asphalt shingles and vehicle body panels. Hail larger than 1.75 inches (H5 or greater) can break skylights, greenhouses, and photovoltaic panels (see Figure 40). While events exceeding 2 inches are rare in Morgan County, the combination of moderate hail and strong wind gusts frequently increases the potential for damage.

[88] Adapted from the Tornado and Storm Research Organization, "The TORRO Hailstorm Intensity Scale," 2025, https://www.torro.org.uk/research/hail/hscale.

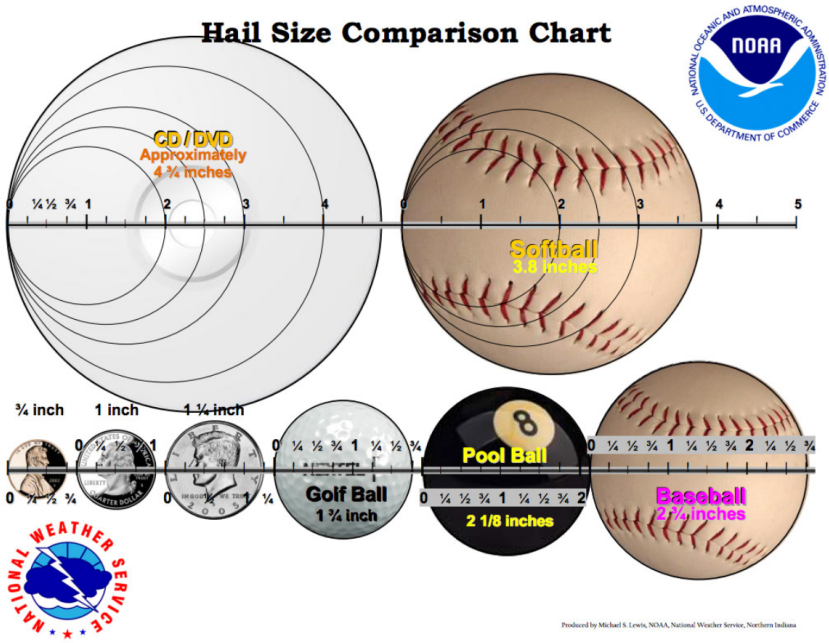


Figure 40: NOAA NWS Hail Size Comparison Chart[89]

In addition to the size of hailstones, shape is also an important factor, especially as the "effective" diameter of non-spheroidal specimens should ideally be calculated as an average of measured dimensions. Irregular, spiked, or jagged hailstones can further increase damage severity due to concentrated impact forces.[90]

Table 29 highlights hail size and diameter classifications in relation to the TORRO Hailstorm Intensity Scale. The Size Code is the maximum reported hail size that is considered consistent with other observational reports and physical evidence.

Table 29: Hail Size and Diameter Descriptions[91]

Size Code	Maximum Diameter (mm)	Description
0	5–9	Pea
1	10–15	Mothball
2	16–20	Marble, grape
3	21–30	Walnut
4	31–40	Pigeon's egg > squash ball

[89] National Oceanic Atmospheric Administration National Weather Service, "Hail Size Comparison Chart," 2025, https://www.weather.gov/media/iwx/webpages/skywarn/Hail_Chart.pdf.
[90] The Tornado and Storm Research Organization, "The TORRO Hailstorm Intensity Scale," 2025, https://www.torro.org.uk/research/hail/hscale.
[91] The Tornado and Storm Research Organization, "The TORRO Hailstorm Intensity Scale," 2025, https://www.torro.org.uk/research/hail/hscale.

Size Code	Maximum Diameter (mm)	Description
5	41–50	Golf ball > pullet's egg
6	51–60	Hen's egg
7	61–75	Tennis ball > cricket ball
8	76–90	Large orange > soft ball
9	91–100	Grapefruit
10	>100	Melon

Historical Occurrences

NOAA's NCEI Storm Events Database records three hail events in Morgan County between January 2000 and October 2025 (see Table 30). Hailstorms in the region are typically short-lived and localized, occurring during late spring and summer when convective thunderstorm activity peaks along the Wasatch Front and Weber River Valley. There have been no state or federal disaster declarations for hail.

Table 30: Recorded Hail Events in Morgan County, 2000–2025

Date	Location	Hail Size (in)	Impacts	Source
June 2000	Morgan City	0.75	Minor roof and vehicle dents	NOAA NCEI
May 2022	Weber Canyon	0.88	Brief storm, no significant damage	NOAA NCEI
July 4, 2025	Near Mountain Green	1.00	Localized roof and vehicle damage	NWS Local Storm Report

The most significant event occurred on July 4, 2025, when a severe thunderstorm near Mountain Green produced hail up to 1 inch in diameter, resulting in localized roof and vehicle damage. Earlier hail events in June 2000 and May 2022 produced smaller hail (0.75 to 0.88 inches) and limited or no reported damage.

Between 2000 and 2025, Morgan County averaged roughly 0.12 hail events per year, consistent with the County's classification as a "Relatively Low" hail risk area in the National Risk Index (NRI). Most events produced hail smaller than 1 inch, with limited impacts on structures or crops.

Supplemental data from the StormerSite hail report database confirm these findings.[92] For 2025, one hail report was documented within Morgan County, with a maximum hail diameter of 1.00 inch and a hail risk score of zero, indicating minimal threat relative to surrounding counties. The ZIP code with the recorded report was 84050 (Morgan City area).

[92] StormerSite, "Hail Reports - Morgan Utah 2025," 2025, https://www.stormersite.com/hail_reports/morgan_utah/2025.

Figure 41 shows the StormerSite 2025 summary for Morgan County, illustrating the number of hail reports, largest hail size, and risk score.

Figure 41: StormerSite Hail Reports for Morgan, Utah 2025[93]

STATE AND FEDERAL DISASTER DECLARATIONS

A review of the FEMA Disaster Declarations Database and Utah Division of Emergency Management records indicates that no federal major disaster declarations or state disaster declarations related specifically to hail have been issued for Morgan County since the previous Hazard Mitigation Plan update. While hail occasionally occurs during convective thunderstorms in northern Utah, documented events in Morgan County have generally been localized and have not resulted in impacts severe enough to trigger a state or federal disaster declaration.

Probability and Effects of Future Conditions

Based on historical observations and NOAA NCEI Storm Events records, the probability of hail events affecting Morgan County within the next five years is considered Possible. Between 2000 and 2025, Morgan County recorded three hail events, corresponding to an average frequency of approximately 0.1 to 0.3 events per year, or roughly one to two events per decade.

The NRI classifies Morgan County's hail risk as "Relatively Low," reflecting both low historical frequency and moderate overall exposure (see Figure 42). However, isolated severe hailstorms have demonstrated the potential for localized, high-cost damage, particularly where population growth and development have increased the number of exposed structures and vehicles.

[93] StormerSite, "Hail Reports - Morgan Utah 2025," 2025, https://www.stormersite.com/hail_reports/morgan_utah/2025.

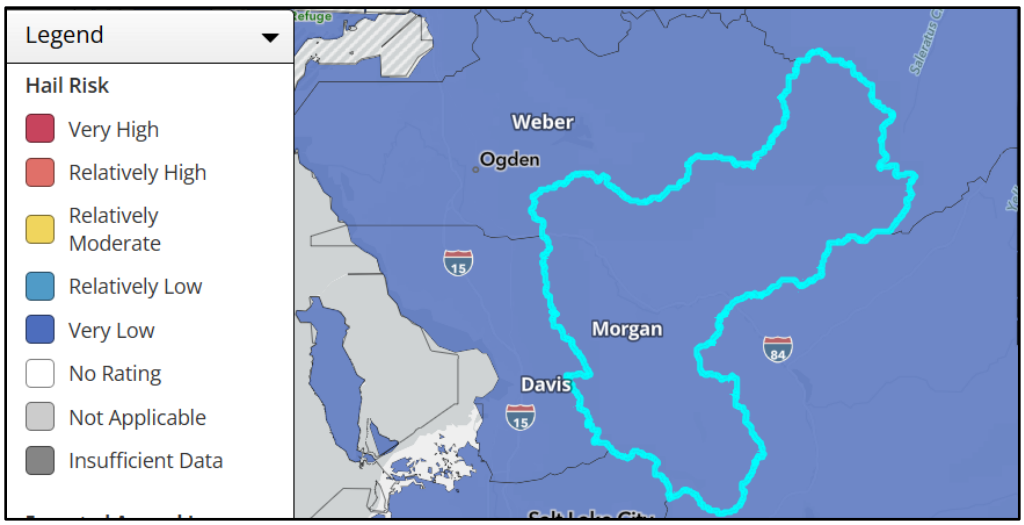


Figure 42: National Risk Index Hail Risk Map for Morgan County[94]

Regional climate modeling by the Utah Climate Center suggests that while the total number of thunderstorm days may decrease slightly due to warming atmospheric conditions, future convective storms may be more intense, with higher potential for large hail in late spring and early summer. This trend aligns with broader observations across the Intermountain West, where warming upper-atmosphere layers can increase the vertical instability that produces hail cores.

Morgan County and its emergency management partners monitor several indicators to assess and track hail risk and inform preparedness:

- Number of severe thunderstorm warnings issued annually that include hail potential
- Number of verified hailstones greater than or equal to 1.0 inch in diameter reported by NWS or NCEI
- Insurance claims or estimated property losses related to hail impacts on structures and vehicles

Although the County's annual hail probability remains low, growing residential and commercial development—particularly in Mountain Green and Morgan Valley—will continue to increase potential exposure.

[94] Federal Emergency Management Agency, National Risk Index, "NRI Morgan County Hail Risk Map and Legend," 2025, https://hazards.fema.gov/nri/map.

High Wind

Hazard Definition

High winds are defined by the NWS as sustained wind speeds of 40 mph or greater lasting for one hour or longer, or wind gusts of 58 mph or greater for any duration. In Morgan County, high-wind events primarily result from synoptic-scale pressure gradients, canyon outflows, downslope (mountain) winds, and thunderstorm downdrafts. Local topography—especially along Weber Canyon, the Wasatch Back foothills, and high-elevation ridgelines—can significantly amplify wind speeds and channel airflow through narrow valleys, leading to localized gusts that may exceed 90–100 mph during major events.

These events can occur in any season, but are most frequent from late fall through spring, often associated with strong frontal passages or mountain wave setups, and during late spring and summer thunderstorms. High winds can damage structures and roofs, uproot trees, topple high-profile vehicles, down power lines, and contribute to secondary hazards such as wildfire spread, hazardous materials releases, dust storms, and transportation accidents. For warning and operations, Morgan County follows NWS High Wind Watch/Warning criteria and local threshold guidance used across northern Utah.

The Utah Enhanced State Hazard Mitigation Plan (2025) groups wind hazards into three primary types—tornado winds, thunderstorm/straight-line winds, and non-thunderstorm high-wind events—all of which can affect Morgan County at varying levels of likelihood and severity.

- **Tornado Winds:** A tornado is a violently rotating column of air extending from a cumulonimbus cloud to the ground. It typically begins as a funnel cloud and may be accompanied by a loud, roaring noise. Although tornadoes are rare in northern Utah, they represent the most locally destructive atmospheric phenomenon, capable of producing severe damage along narrow paths.
- **Thunderstorm or Straight-Line Winds:** Straight-line winds are all winds produced by thunderstorms that are not associated with tornado rotation. These winds are responsible for most thunderstorm wind damage and may exceed 100 mph. Subtypes include the following:
  - **Downburst:** A strong downdraft of air from a cumulonimbus cloud that produces damaging surface winds comparable to a tornado.
  - **Microburst:** A compact downdraft with an outflow area less than 2.5 miles wide and peak winds lasting fewer than five minutes. Microbursts generate intense wind shear that can endanger aircraft and damage property.
  - **Dry Microburst:** A microburst with little or no precipitation reaching the ground, often visible only as a dust ring or plume.
  - **Derechos:** Although uncommon west of the Great Plains, derechos occasionally affect interior portions of the western United States, including Utah (see Figure 43). A notable example occurred on May 31, 1994, impacting several western states, including parts of Utah.

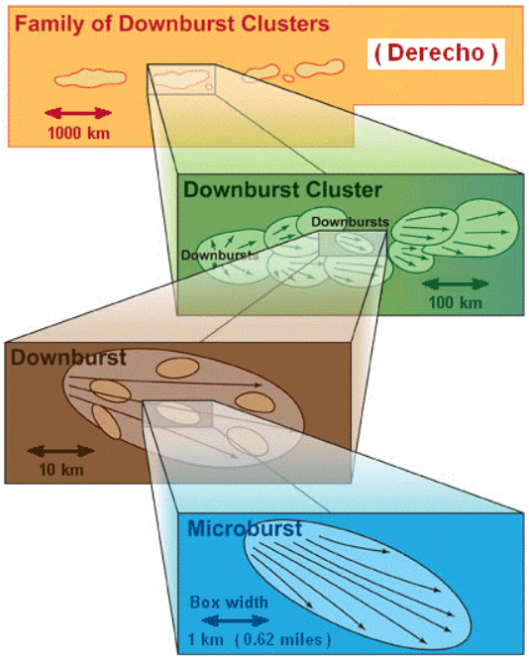


Figure 43: Conceptual Structure of a Derecho Windstorm[95]

- **Non-Thunderstorm High-Wind Events:** High-wind events in Utah are typically associated with gradient winds, gap winds, or downslope (mountain) winds. These can produce catastrophic structural damage and pose significant safety risks due to flying debris, power disruption, and wildfire spread. Types include the following:
  - **Gradient High Winds:** Broad-area winds generated by strong pressure differences in extratropical low-pressure systems.
  - **Gap Winds:** Strong, channeled winds funneled through mountain passes or canyons, such as Weber Canyon, where acceleration occurs due to constricted terrain.
  - **Downslope Winds:** Winds formed when a deep air mass is forced over a mountain barrier and accelerates down the lee slope, often creating a wave at the mountain base where the strongest winds occur.

Geographic Location

High wind exposure in Morgan County is shaped primarily by topography and elevation, with the Weber Canyon corridor, Mountain Green foothills, and high-elevation ridgelines representing the most wind-prone areas. Regional analyses and the Utah Climate Center's 30-year wind climatology (1991–2020) indicate that average annual wind speeds in exposed corridors commonly exceed 15–20 mph, with extreme gusts reaching 70 to 100+ mph during major windstorm events.

[95] National Oceanic and Atmospheric Administration, National Weather Service, "About Derechos," 2025, https://www.spc.noaa.gov/misc/AbtDerechos/derechofacts.htm#bowecho.

Morgan County lies at the transition between the Wasatch Front and Wasatch Back, where steep canyon walls, valley constrictions, and pressure gradients accelerate airflow through narrow mountain gaps. These terrain-driven effects often magnify wind intensity beyond regional averages, particularly during downslope and gap wind events, making the Weber Canyon mouth and adjacent ridgelines among the most wind-exposed areas in northern Utah.

Table 31 summarizes typical wind exposure patterns across the County by general area.

Table 31: Typical Wind Exposure by Area

Area/Zone	Relative Wind Exposure	Primary Wind Mechanisms	Typical Gust Range (mph)	Key Impacts
Weber Canyon Corridor	High	Gap winds, downslope acceleration	70–100	Power line failures and vehicle instability on I-84
Mountain Green Foothills	High	Canyon outflow, pressure gradient amplification	60–90	Roof and fence damage and downed trees
East Canyon and Porterville Area	Moderate	Frontal and convective gusts	50–75	Localized outages and soil erosion
Morgan Valley Floor	Low–Moderate	Thunderstorm outflows and gust fronts	40–60	Temporary debris and crop impacts
High-Elevation Ridges	High	Gradient and downslope winds	80–100+	Disruption to utilities, communications, and transportation

Localized high-wind events are also influenced by thunderstorm outflows, microbursts, and cold-front passages, which can generate short-duration bursts exceeding 60 mph even in typically sheltered valley locations. These convective events can occur anywhere in the County but are most frequent in spring and early summer. In contrast, long-duration canyon and downslope windstorms associated with strong synoptic pressure gradients (such as the September 8, 2020, Wasatch Front windstorm) tend to affect larger areas regionwide, producing sustained gusts of 80 to 100+ mph along canyon mouths and ridgelines and causing widespread power outages and tree loss.

Overall, Morgan County's high-wind exposure can be characterized as localized but severe (primarily canyon corridors and ridges), with damaging winds (≥58 mph) recurring approximately every two to three years (with one to two reportable events per cycle) and extreme events (≥80 mph) occurring on the order of once per decade. Exposure continues to increase as development expands in Mountain Green, Peterson, and upper Morgan Valley, placing more structures, utilities, and transportation corridors within high-wind corridors.

EXPOSURE AND VULNERABILITY

High-wind exposure is concentrated along Weber Canyon and I-84, the Mountain Green and Peterson foothills, and high-elevation ridgelines, where gap winds and mountain waves are strongest. Residential neighborhoods, schools, critical facilities, and overhead power and communication lines in these areas are particularly vulnerable to tree fall, roof damage, and line failures. Manufactured homes, older agricultural buildings, and facilities with large-span or lightly anchored roofs face higher risk of structural damage. Socially vulnerable populations—including lower-income households, renters, and medically dependent residents—may experience longer recovery periods from power outages and damaged housing. Annexes for Morgan City, Unincorporated County, and the School District will provide more detailed facility-level exposure and mitigation actions.

Magnitude and Severity

The magnitude and severity of wind hazards in Morgan County vary by event type and associated weather system. Wind intensity is typically classified using the Enhanced Fujita (EF) Scale for tornadoes, the Beaufort Wind Scale for general wind force, and observed gust speeds for thunderstorm-related or synoptic high-wind events. These standardized measures allow for consistent assessment of structural damage potential, hazard extent, and probable impacts across the County. The EF Scale is applied only to tornado damage, while the Beaufort Wind Scale is used descriptively for non-tornadic high-wind events such as canyon, gradient, and downslope windstorms.

TORNADOES

Tornado magnitude and severity are classified using the EF Scale, which assigns a rating from EF0 to EF5 based on observed damage and corresponding estimated wind speeds (see Table 32). Most Utah tornadoes are weak (EF0–EF1), and tornadoes are rare in Morgan County; no strong or violent (EF3–EF5) tornadoes have been recorded in the County to date. Statewide data show that weak tornadoes (EF0–EF1) account for over 90% of Utah events, with no EF4–EF5 tornadoes observed.

Table 32: Enhanced Fujita Scale

EF Rating	Estimated Three-Second Gust (mph)	Damage Description
EF0	65–85	Minor damage to roofs, siding, and trees.
EF1	86–110	Moderate roof and structural damage; mobile homes overturned.
EF2	111–135	Significant roof loss; large trees uprooted; light vehicles lifted.
EF3	136–165	Severe structural damage; trains overturned; heavy cars lifted.
EF4	166–200	Well-constructed houses leveled; debris missiles generated.

EF Rating	Estimated Three-Second Gust (mph)	Damage Description
EF5	>200	Complete destruction of strong frame houses; foundation swept clean.

Given this history, tornadoes represent a low-probability, high-consequence wind hazard for Morgan County, while most wind damage is caused by non-tornadic high-wind and thunderstorm outflows.

THUNDERSTORMS/STRONG WINDS/STRAIGHT-LINE WINDS

Thunderstorm winds—including downbursts, microbursts, and straight-line winds (derechos)—are among the most frequent sources of damaging winds in northern Utah. These winds originate from strong downdrafts of rain-cooled air that descend rapidly and spread outward, sometimes producing gusts of at least 58 mph, the NWS threshold for "severe thunderstorm wind."

Although short-lived, microbursts and downbursts can generate localized wind speeds exceeding 100 mph, causing damage comparable to an EF1 or EF2 tornado. Straight-line winds are responsible for most thunderstorm-related wind damage in Utah.

Subtypes include the following:

- **Downburst:** A strong downward rush of air from a thunderstorm producing damaging surface winds.
- **Microburst:** A small, intense downdraft (less than 2.5 miles wide) with peak winds lasting under five minutes.
- **Dry Microburst:** A microburst with minimal or no precipitation, often identified by a visible dust plume.
- **Derecho:** A widespread, long-lived windstorm associated with fast-moving thunderstorms, occasionally observed in Utah during late spring and summer.

Figure 44 shows the NWS Thunderstorm Wind Gust Hazard Risk Levels for Utah, which categorize wind gust potential as Low (50–64 mph), Moderate (65–84 mph), or High (85 mph or higher).

Thunderstorm Wind Gust Hazards	
RISK LEVEL	HAZARD DESCRIPTION
Low	▪ Chance of a damaging wind gust (>57 mph or 50 kt) is in the 5-15% range. ▪ Strong wind gusts expected to be in the 39 to 57 mph (34-49 kt) range.
Moderate	▪ Chance of a damaging wind gust (>57 mph or 50 kt) is in the 15-25% range. ▪ Damaging wind gusts expected to be in the 58 to 75 mph (50-64 kt) range.
High	▪ Chance of a damaging wind gust (>57 mph or 50 kt) is greater than 25%. ▪ Destructive wind gusts expected to exceed 75 mph (64 kt) range.

Figure 44: National Weather Service Thunderstorm Wind Gust Hazards Risk Level[96]

In Morgan County, most thunderstorm wind events fall in the 50 to 75 mph range, with occasional higher gusts capable of downing trees and power lines, damaging lightweight structures, and creating hazardous crosswinds for high-profile vehicles on I-84 and state routes.

HIGH WINDS

Outside of thunderstorms, synoptic and topographically driven high-wind events are among Morgan County's most impactful atmospheric hazards. These winds are generated by large-scale pressure gradients, mountain waves, and canyon funneling, particularly within Weber Canyon and the Mountain Green foothills. The Beaufort Wind Scale is used as a descriptive reference for estimating wind effects, with forces of 9 to 12 (Severe Gale to Hurricane Force) associated with tree uprooting, roof damage, and widespread power outages.

[96] National Oceanic and Atmospheric Administration, National Weather Service, "Thunderstorm Wind Gust Hazards Risk Level Chart," https://www.weather.gov/mhx/ConvectiveWindGust.

Table 33 provides the scale, with descriptions of wind forces, speed, and typical effects.

Table 33: Beaufort Wind Scale[97]

Force	Speed (mph)	Speed (knots)	Description	Specifications
0	0–1	0–1	Calm	Calm; smoke rises vertically.
1	1–3	1–3	Light Air	Direction of wind shown by smoke drift, but not by wind vanes.
2	4–7	4–6	Light Breeze	Wind felt on face; leaves rustle; ordinary vanes moved by wind.
3	8–12	7–10	Gentle Breeze	Leaves and small twigs in constant motion; wind extends light flag.
4	13–18	11–16	Moderate Breeze	Raises dust and loose paper; small branches are moved.
5	19–24	17–21	Fresh Breeze	Small trees in leaf begin to sway; crested wavelets form on inland waters.
6	25–31	22–27	Strong Breeze	Large branches in motion; whistling heard in telegraph wires; umbrellas used with difficulty.
7	32–38	28–33	Near Gale	Whole trees in motion; inconvenience felt when walking against the wind.
8	39–46	34–40	Gale	Breaks twigs off trees; generally impedes progress.
9	47–54	41–47	Severe Gale	Slight structural damage occurs (chimney-pots and slates removed)
10	55–63	48–55	Storm	Seldom experienced inland; trees uprooted; considerable structural damage occurs.
11	64–72	56–63	Violent Storm	Very rarely experienced; accompanied by widespread damage.
12	≥74	64–71	Hurricane Force (≥74)	Extensive destruction.

[97] National Oceanic and Atmospheric Administration, National Weather Service, "Hail and Wind Page-Beaufort Wind Scale," 2025, https://preview.weather.gov/gjt/hailwind.

In Morgan County, most high-wind events range between 40 and 70 mph, but historic canyon windstorms (notably December 2011 and September 2020) have produced gusts near or exceeding 100 mph at exposed locations, resulting in extensive tree loss, structural damage, and multiday power outages (see Table 34).

Table 34: Wind Severity in Morgan County

Category	Peak Gust (mph)	Typical Effects in Morgan County	Approximate Frequency
Minor	40–57	Advisory-level; small branches down, minor debris; limited outages	Several times per year
Moderate	58–74	NWS "high wind"/severe thunderstorm criteria; scattered tree and fence damage, short outages, some vehicle instability	1–2 events every 2–3 years
Severe	75–95	Regional windstorm; widespread treefall, roof damage, overturned trucks, multi-hour to multiday outages	1 event every 5–10 years
Extreme	96+	Rare canyon/mountain wave events; extensive damage to trees and structures, long-duration outages	Rare/once per decade or longer

NATIONAL RISK INDEX

The National Risk Index (NRI) report for Morgan County shows an annualized frequency for tornadoes of 0.0 events per year, with one event on record between 1950 and 2021 (72 years) (see Figure 45).[98]

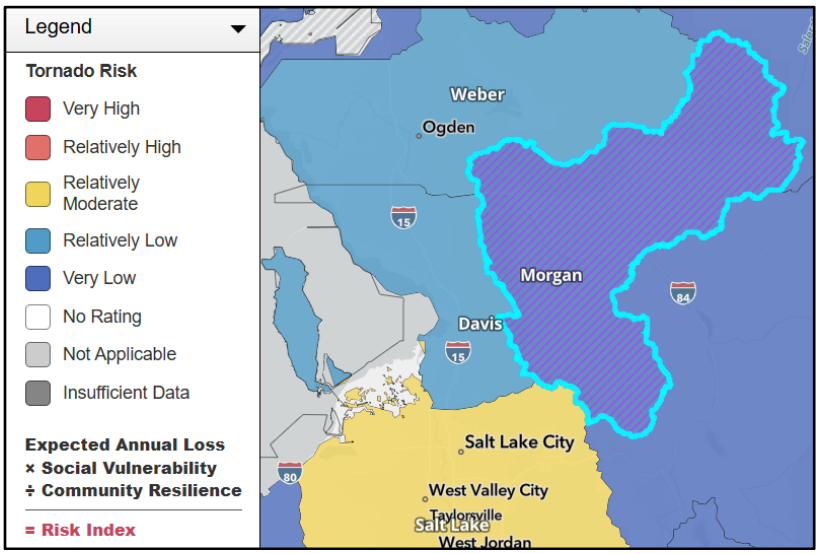


Figure 45: National Risk Index Tornado Risk Map for Morgan County[99]

The NRI report also shows an annualized frequency for strong wind of 0.9 events per year, with 31 events on record between 1996 and 2021 (34 years) (see Figure 46).[100]

[98] Federal Emergency Management Agency, National Risk Index, "Summary Report-Annualized Frequency Tornadoes Morgan County Utah 2005-2021," 2025, https://hazards.fema.gov/nri/report/viewer?dataLOD=Counties&dataIDs=C49029.
[99] Federal Emergency Management Agency, National Risk Index, "Risk Map and Legend Tornadoes Morgan Count," 2025, https://hazards.fema.gov/nri/map.
[100] Federal Emergency Management Agency, National Risk Index, "Summary Report-Annualized Frequency Strong Wind Morgan County Utah 2005-2021," 2025, https://hazards.fema.gov/nri/report/viewer?dataLOD=Counties&dataIDs=C49029.

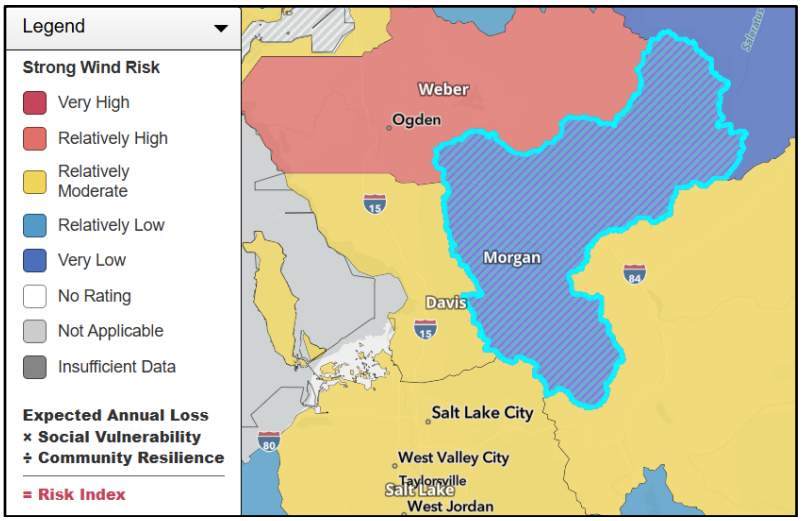


Figure 46: National Risk Index Strong Wind Risk Map for Morgan County[101]

Figure 47 shows tornado frequency by year, with both actual annual counts (bars) and a five-year moving average (line) to reveal long-term trends in Utah. The chart indicates that 1998 was the most active year, with seven recorded tornadoes statewide. The five-year moving average reveals a notable decrease—41% lower—compared to earlier periods. The most recent 10-year average is 1.9 tornadoes per year.[102]

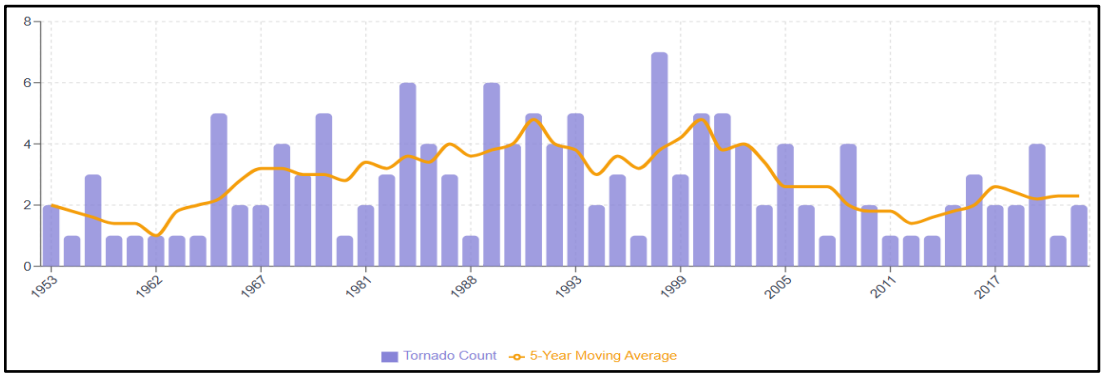


Figure 47: Annual Tornado Trends in Utah[103]

Figure 48 shows tornado frequency by month, highlighting seasonal patterns and identifying peak tornado periods. May is the most active month, with 31 tornadoes (22% of all recorded events) in Utah. The primary tornado season for Utah occurs during May, August, and September, which together account for 59% of all tornadoes in the state.[104]

[101] Federal Emergency Management Agency, National Risk Index, "Risk Map and Legend Strong Wind Morgan Count," 2025, https://hazards.fema.gov/nri/map.
[102] TornadoPath, "Tornado Analysis and Trends-Utah Annual Tornado Trends," 2025, https://www.tornadopath.com/utah.
[103] TornadoPath, "Tornado Analysis and Trends- Utah Annual Tornado Trends," 2025, https://www.tornadopath.com/utah.
[104] TornadoPath, "Tornado Analysis and Trends-Utah Monthly Distribution Chart," 2025, https://www.tornadopath.com/utah.

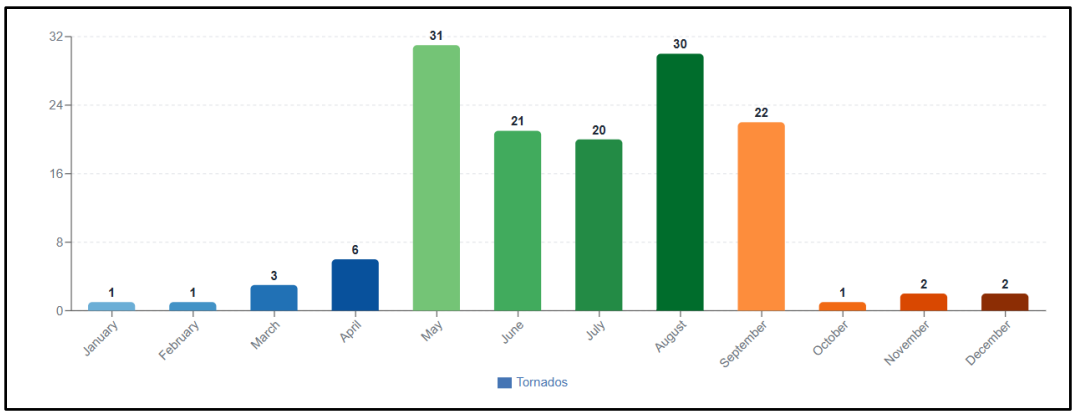


Figure 48: Utah Monthly Distribution of Tornadoes[105]

Figure 49 shows the breakdown of tornadoes by intensity rating (EF scale). Vertical bars compare the prevalence of different tornado strengths, with counts and percentages displayed above each bar. EF0 tornadoes are the most common, comprising 70.4% of all recorded events in Utah. Weak tornadoes (EF0–EF1) account for 91.3% of all events, while strong tornadoes (EF2–EF3) make up 8.7%. There have been no recorded violent tornadoes (EF4–EF5) in this region.[106]

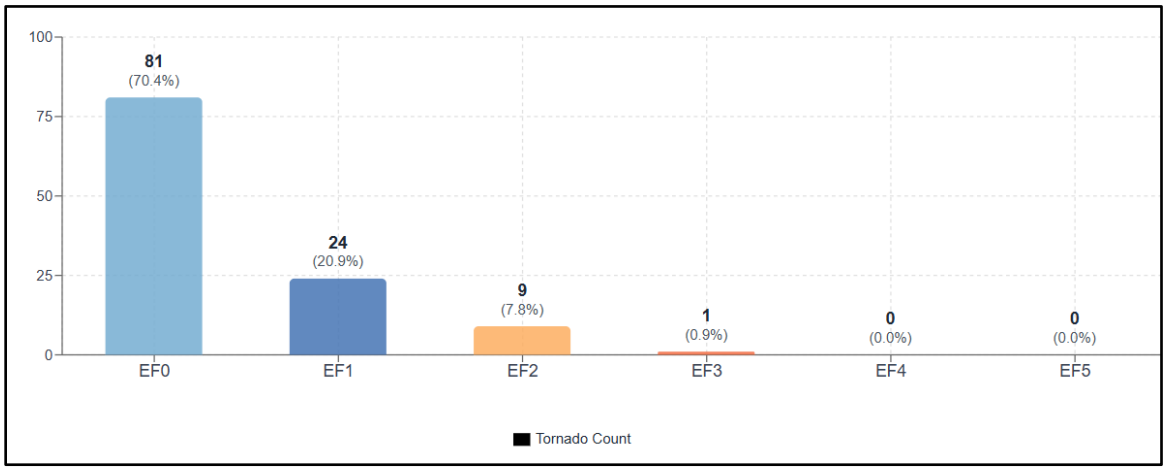


Figure 49: Utah Tornado Intensity Distribution[107]

Historical Occurrences

High-wind events are among the most frequent and damaging atmospheric hazards in Morgan County. Although rarely catastrophic, these events routinely cause infrastructure disruptions, tree damage, power

[105] TornadoPath, "Tornado Analysis and Trends-Utah Monthly Distribution Chart," 2025, https://www.tornadopath.com/utah.
[106] TornadoPath, "Tornado Analysis and Trends-Utah Tornado Intensity Distribution Chart," 2025, https://www.tornadopath.com/utah.
[107] TornadoPath, "Tornado Analysis and Trends-Utah Tornado Intensity Distribution Chart," 2025, https://www.tornadopath.com/utah.

outages, overturned trucks, and hazardous crosswinds, particularly along canyon corridors and ridgetop communities. According to the NCEI Storm Events Database and Utah Climate Center records, Morgan County and adjacent Wasatch Front counties have experienced dozens of recorded high wind, strong wind, and thunderstorm wind events since 1996, including at least 12 events with gusts of 58 mph or higher meeting NWS high-wind criteria between 2000 and 2025. While no federal or state disaster declarations for wind have occurred since the prior plan update, in 2020 Morgan County was included in a disaster declaration for straight-line wind (DR-4578).

DOCUMENTED HIGH-WIND EVENTS

Table 35 summarizes selected significant high-wind events recorded in or near Morgan County since 2000, including wind intensity, general location, and primary reported impacts.

Table 35: Selected Historical High-Wind Events – Morgan County and Vicinity[108]

Date	Location	Peak Gust (mph)	Event Type/Cause	Reported Impacts	Source
September 8–9, 2020	Wasatch Front (including Morgan)	95	Downslope/Canyon Windstorm	Widespread tree and roof damage; 180,000+ power outages regionwide; overturned trucks on I-84	NWS/NCEI
February 21, 2017	Weber and Morgan Counties	78	Gradient Wind	Trees down; minor structure damage near Mountain Green	NCEI
April 14, 2013	Morgan County	72	Thunderstorm Downburst	Temporary road blockage; minor property damage	NCEI
November 12, 2011	Northern Utah	102	Downslope Windstorm	Regional damage exceeding $10 million; gusts above 100 mph in canyons	UAC/UDOT
January 23, 2008	Morgan Valley	67	Gradient/Frontal Passage	Power interruptions; localized tree loss	NWS
May 4, 2004	East Canyon Area	64	Thunderstorm Outflow	No injuries; minor agricultural impacts	NCEI

Between 2000 and 2025, Morgan County experienced at least 12 high-wind events with gusts exceeding 58 mph—meeting the NWS's threshold for "high wind." On average, one to two reportable events occur every three years, though lower-magnitude winds are observed several times each season.

[108] NCEI: National Centers for Environmental Information; NWS: National Weather Service; UAC: Utah Avalanche Center; UDOT: Utah Department of Transportation.

REGIONAL CONTEXT AND NOTABLE EVENTS

Regional windstorms that primarily affect Davis, Weber, and Salt Lake Counties often extend into Morgan County, especially through Weber Canyon and adjacent foothills. The December 1, 2011, downslope windstorm produced gusts over 100 mph along portions of the Wasatch Front and caused regional damage estimated at more than $20 million, with widespread tree damage and outages extending into Weber and Morgan Counties. The September 8, 2020 windstorm produced hurricane-force gusts reaching 112 mph at the University of Utah and up to 99 mph near Farmington, leaving more than 200,000 customers without power and damaging trees, cemeteries, and parks along the Wasatch Front; Morgan County experienced tree fall, power outages, and school and facility disruptions during this event.

FREQUENCY AND RECURRENCE

Analysis of 25 years of wind data (2000–2025) indicates the following approximate recurrence intervals for damaging winds in Morgan County (see Table 36).

Table 36: Estimated Recurrence of Damaging Wind Events in Morgan County

Wind Speed Range (mph)	Typical Frequency	Estimated Return Interval
40–58 (Advisory Level)	Multiple times annually	Seasonal
59–74 (Warning Level)	1–2 events every 2–3 years	Biennial
75–100+ (Severe Windstorm)	1 event every 5–10 years	Decadal

Windstorm recurrence is strongly influenced by regional pressure gradients and terrain channeling, particularly in the Weber Canyon and Mountain Green areas. As population and infrastructure continue to expand into these high-exposure corridors, the probability of damage per event increases, even if the frequency of windstorms remains relatively stable.

STATE AND FEDERAL DISASTER DECLARATIONS

Since the previous Morgan County Hazard Mitigation Plan update, Morgan County has been included in one federal major disaster declaration related to high-wind impacts. In September 2020, the County was included in FEMA Major Disaster Declaration DR-4578-UT, issued following a severe regional windstorm that produced hurricane-force gusts across the Wasatch Front and caused widespread tree damage, power outages, and infrastructure impacts.

Aside from this event, no additional federal major disaster declarations or state disaster declarations specifically associated with high-wind impacts have been issued for Morgan County since the last plan update.

Probability and Effects of Future Conditions

Based on historical wind records, National Weather Service observations, and National Risk Index frequency estimates, the probability of high-wind events affecting Morgan County within the next five years is considered Likely. Historical records indicate that Morgan County experiences damaging wind gusts (58 mph or higher) approximately every two to three years, while extreme canyon windstorms producing gusts above 80 mph occur approximately once per decade.

Overall, the meteorological frequency of high-wind events is expected to remain similar to recent decades, but exposure and potential losses will increase as development continues in canyon corridors, foothills, and high-elevation areas, and as critical infrastructure—including power, communications, transportation—becomes more interconnected and vulnerable to disruption.

DRIVERS OF FUTURE PROBABILITY

- **Synoptic and Canyon Wind Patterns:** Strong regional pressure gradients, especially during late fall through spring storms, will continue to generate high winds in Morgan County. Weber Canyon, Mountain Green, and nearby foothill corridors will remain the most prone to extreme gusts because terrain funnels and accelerates airflow. Climate modeling suggests that modest shifts in storm-track position, jet-level winds, and pressure-gradient intensity may increase the *clustering* of strong wind events, even if annual wind climatology remains broadly similar.
- **Convective Winds (Thunderstorm Downbursts and Microbursts):** Rising temperatures and increased atmospheric moisture during spring and summer are expected to enhance convective instability, which can lead to stronger downbursts and microbursts, even if the number of thunderstorms does not substantially change. This may increase the likelihood of short-duration but damaging wind events capable of downing trees, roofs, and power lines anywhere in the county.
- **Land Use, Development, and Exposure:** Growth in Mountain Green, Peterson, and upper Morgan Valley places more structures, utilities, and transportation corridors directly within high-wind zones. Even if wind climatology remains stable, the total damage per event is likely to increase because a larger number of homes, schools, businesses, and linear infrastructure will be exposed to strong winds. Expansion of development into canyon mouths, foothills, and ridgelines—areas with naturally higher gust potential—further increases countywide vulnerability.
- **Climate Variability and Future Wind Patterns:** Climate modeling for the Intermountain West indicates that seasonal wind characteristics may shift due to altered storm tracks and pressure gradients. The Utah State Enhanced Hazard Mitigation Plan (2025) notes the following:
  - More frequent high-intensity storm systems capable of producing strong gusts
  - Increased winter-to-spring variability, with extreme events clustering in shorter windows
  - Continued risk of dust storms and wildfire spread linked to high-wind and drought conditions

Although future annual averages of wind speed may show little change, extreme wind gusts are expected to remain as frequent or slightly more intense, consistent with observed trends across northern Utah since 2010 (see Table 37).

Table 37: Probability and Severity Summary

Wind Type	Typical Frequency	Typical Peak Gust (mph)	Trend (2050 Outlook)	Relative Probability
Canyon/Downslope Windstorm	1 per 5–10 years	80–100+	Stable to Slight Increase	**High**
Thunderstorm/Downburst Wind	1–2 per year	60–90	Slight Increase	**Moderate**
Gradient/Synoptic High Wind	2–3 per year	50–75	Stable	**High**
Localized Gust Events (<1 hr)	Several annually	40–60	Stable	**High**

The overall probability of future damaging wind events (58 mph or higher) in Morgan County is high, with an expected recurrence interval of every two to three years. Extreme events exceeding 80 mph are expected approximately once per decade, most commonly during late winter and spring.

Taken together, these factors support a high overall probability of future damaging wind events (58 mph or higher) in Morgan County, with moderate to high severity depending on event type and exposure, and a once-per-decade likelihood of extreme canyon windstorms capable of causing regionally significant damage and multiday disruptions.

Landslides

Hazard Definition

A landslide is the downslope movement of soil, rock, and debris under the influence of gravity. Landslides include a range of processes—falling, toppling, sliding, spreading, and flowing—and can occur slowly over months to years or suddenly during a single storm or earthquake. In Utah and in Morgan County, landslides most often occur on moderate to steep slopes or in weak geologic materials, and are commonly reactivations of pre-existing landslide deposits rather than entirely new failures.

Landslides are typically triggered by combinations of sustained above-average precipitation, intense rainstorms, rapid snowmelt, and rain-on-snow events, which increase soil pore-water pressure and reduce slope strength. Other important contributors include erosion of the slope toe, loss of vegetation following wildfire, and ground shaking during earthquakes—particularly from the nearby Wasatch fault system. Human activities—such as cutting or over-steepening slopes, loading the tops of slopes with fill or structures, concentrating runoff, or increasing soil moisture through irrigation and septic systems—can also initiate or accelerate slope movement (see Figure 50).

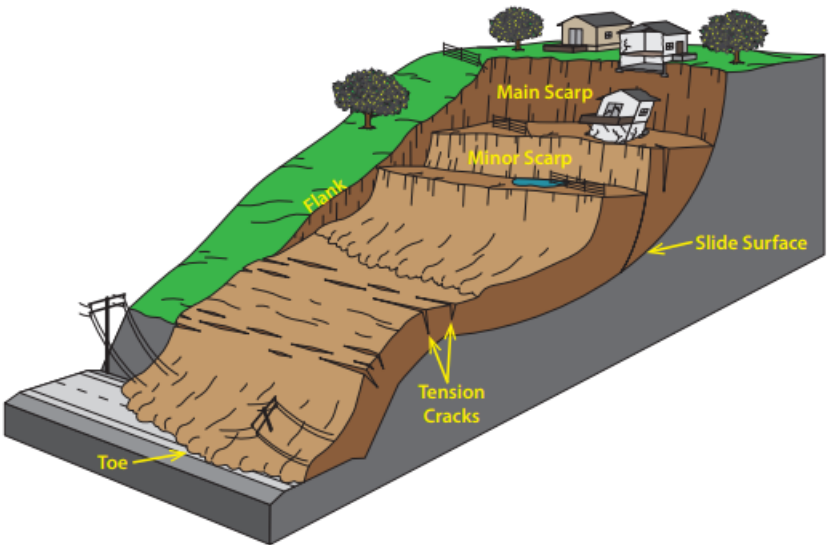


Figure 50: Typical Landslide Components[109]

Landslides in Morgan County can appear in several forms, consistent with U.S. Geological Survey landslide classifications (see Figure 51):

- **Rockfalls and topples** are downslope movements of loosened blocks or boulders from a bedrock area. These generally occur along steep canyons with cliffs, deeply incised stream channels in bedrock,

[109] Utah Geological Survey, Gregg Buekelman, "Landslide Hazards in Utah,"2011, https://ugspub.nr.utah.gov/publications/public_information/pi-98.pdf.

and steep bedrock road cuts. The greatest damage from rockfalls has been to roads, railroads, and aboveground pipelines.

- **Debris slides and flows** occur in steep mountainous areas and involve the relatively rapid, viscous flow of coarse-grained soil, rock, vegetation, and other surface materials. Debris flows contain more water than slides and are potentially more dangerous because they can form quickly, move at high speeds, and travel long distances. Debris flows generally remain in stream channels but can flow out from canyon mouths for a considerable distance. They can damage buildings, bridges, roads, railroads, and pipelines. Areas that have been impacted by wildfire may be more likely to experience a debris flow because vegetation no longer holds soils in place.
- **Earth slides and flows** are composed of fine-grained material, but earth flows contain more water than earth slides. Earth slides and flows vary in size, including some of the largest past earth slides in Utah. Like other landslides, they can damage anything in their path.
- **Slumps** are common along road embankments and river terraces. They slip or slide along a curved plane away from the upper part of a slope, leaving a scarp. They generally do not move far from the source area.

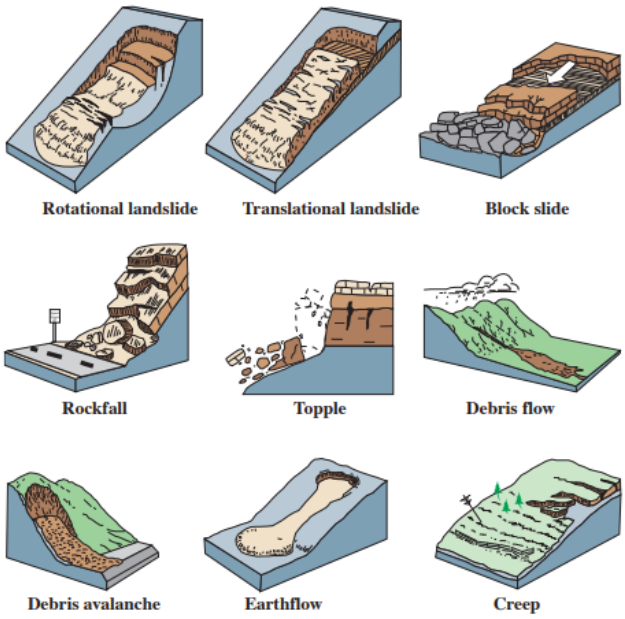


Figure 51: Major Types of Landslides[110]

Geographic Location

Landslide distribution in Morgan County is controlled by geology, topography, and climate. Slopes underlain by weak sedimentary rocks, thick colluvium, or old landslide deposits—and exposed to high

[110] Utah Geological Survey, Gregg Buekelman, "Landslide Hazards in Utah,"2011, https://ugspub.nr.utah.gov/publications/public_information/pi-98.pdf.

precipitation or snowmelt—are most susceptible, particularly along the margins of Morgan Valley and in steep canyon areas. Nearly all mapped landslides in Utah, including those in Morgan County, are reactivations of older landslides, which means that slopes that have failed in the past are the most likely to move again.

In Morgan County, landslides and landslide-prone areas are most common on the eastern slopes of the Wasatch Range and on benches and canyon walls overlooking the Weber River and major tributaries. Field observations and Utah Geological Survey (UGS) mapping show concentrations of landslides and high-susceptibility terrain in and around the following areas (see Figure 52):

- The Trappers Loop/SR-167 corridor and adjacent Wasatch slopes
- The Durst Mountain area and benches above Morgan Valley
- The Red Rock Peak area and other steep slopes along the valley margins.

Recent development pressure has expanded residential and infrastructure footprints into these hillside and bench areas, increasing exposure to both slow-moving and rapid slope failures.

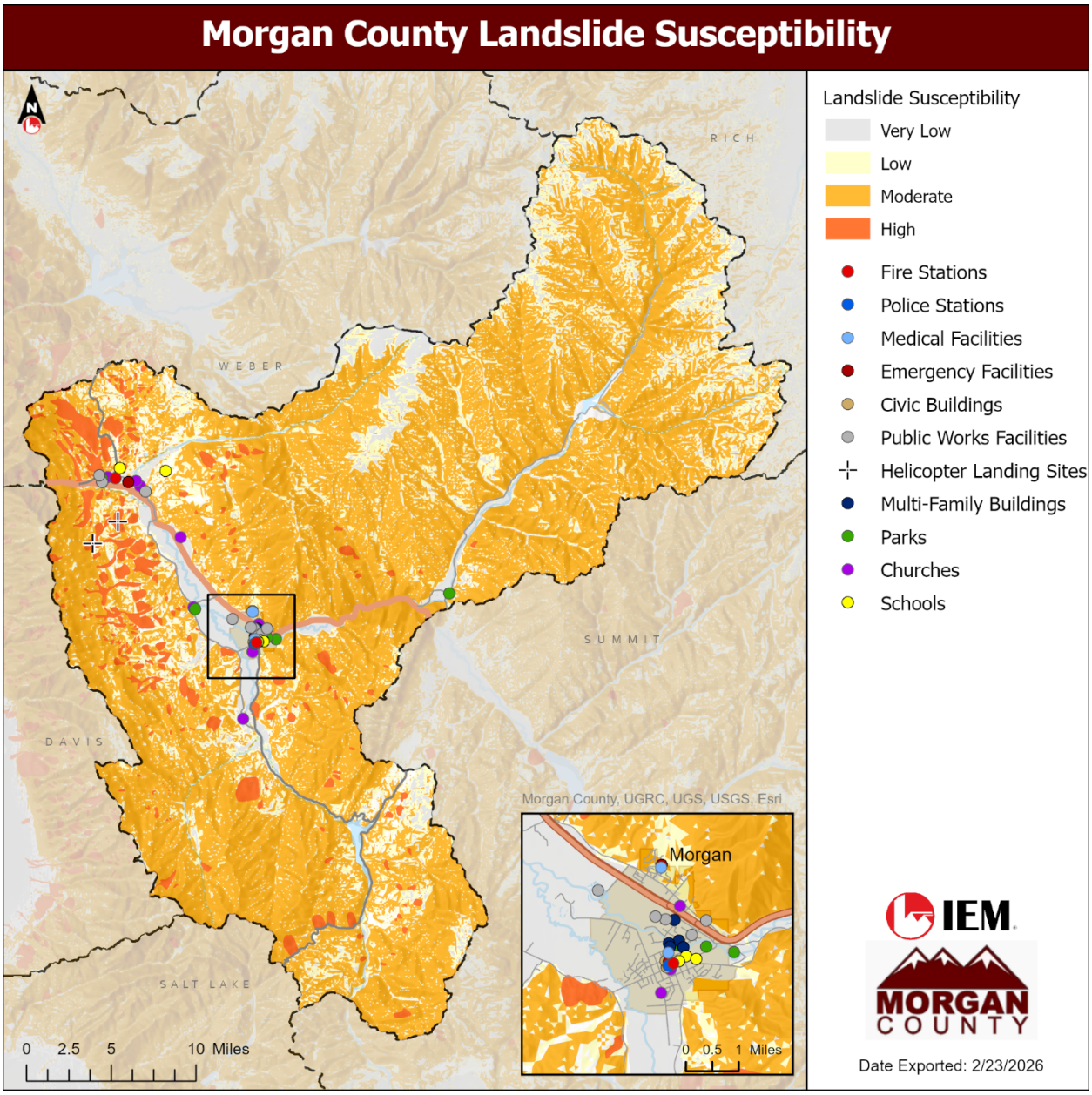


Figure 52: County Facilities in Landslide-Susceptible Areas

Magnitude and Severity

For Morgan County, landslide magnitude and severity are best described in terms of landslide susceptibility categories and the type and scale of damage they can cause. UGS's *Landslide Susceptibility Map of Utah* assigns High, Moderate, Low, and Very Low susceptibility based on the presence of mapped landslides and on slope-angle thresholds by geologic unit. Areas with existing shallow or deep-seated

landslides are classified as High susceptibility; slopes with angles similar to those where landslides are already mapped are classified Moderate; gentler slopes are assigned Low or Very Low susceptibility.[111]

The following categories describe relative landslide susceptibility in Utah:[112]

- **High Susceptibility:** Areas of existing shallow and deep landslides. Slope angle and geologic unit are not considered in this category.
- **Moderate Susceptibility:** Areas that have slopes prone to landsliding based on observed landslide slope angles. The category includes slopes greater than 7° (12%) to greater than 18° (32%), depending on the geologic unit.
- **Low Susceptibility:** Areas that have slopes that may produce landslides. The category includes slopes from 5° to 7° (9–12%) for the lower slope-angle threshold and from 13° to 18° (23–32%) for the upper slope-angle threshold, depending on the geologic unit.
- **Very Low Susceptibility:** Areas that are unlikely to produce landslides. The category includes slopes less than 5° (9%) to less than 7° (12%), depending on the geologic unit.

In Morgan County, most documented landslides are small to moderate in volume, producing localized damage such as road shoulder failures, culvert deformation, and cracking or settlement of foundations and yards. The April 2023 Trappers Loop Bend rotational slide, for example, had a headscarp about 11 feet high and dimensions roughly three-quarters the size of a football field, damaging fences but not SR-167 itself.

While individual events have so far produced limited structural losses, even small landslides can have outsized operational and economic consequences. Rockfalls and debris-related slope failures can close I-84 and SR-167 for several hours at a time, requiring repeated cleanup and contributing to long-term maintenance costs. For planning purposes, landslide hazard severity in Morgan County is best characterized as Moderate to Severe at sites in High and Moderate susceptibility areas, and Low elsewhere, even though the area of potential impact is geographically widespread.

Historical Occurrences

Landslides are a recurring but generally localized hazard in Morgan County. According to FEMA's Disaster Declarations database, Morgan County has not received a major disaster declaration for landslides between 2000 and 2025, but smaller slope failures are documented in UGS reports, media coverage, and local emergency management and public works records. Most events have affected transportation corridors and hillside residential areas rather than causing countywide damage.

[111] Richard E. Giraud and Lucas M. Shaw, *Landslide Susceptibility Map of Utah*, 2007, Utah Geological Survey, https://ugspub.nr.utah.gov/publications/maps/m-228/m-228.pdf.
[112] Richard E. Giraud and Lucas M. Shaw, *Landslide Susceptibility Map of Utah*, 2007, Utah Geological Survey, https://ugspub.nr.utah.gov/publications/maps/m-228/m-228.pdf.

The UGS Landslide Inventory is a compilation of mapped landslide activity throughout the state. Where available, landslide scarps are shown, which identify the area where landslide material has moved downslope away from the undisturbed ground at the source area. Locations where historic landslide activity have been recorded is shown in Figure 53.

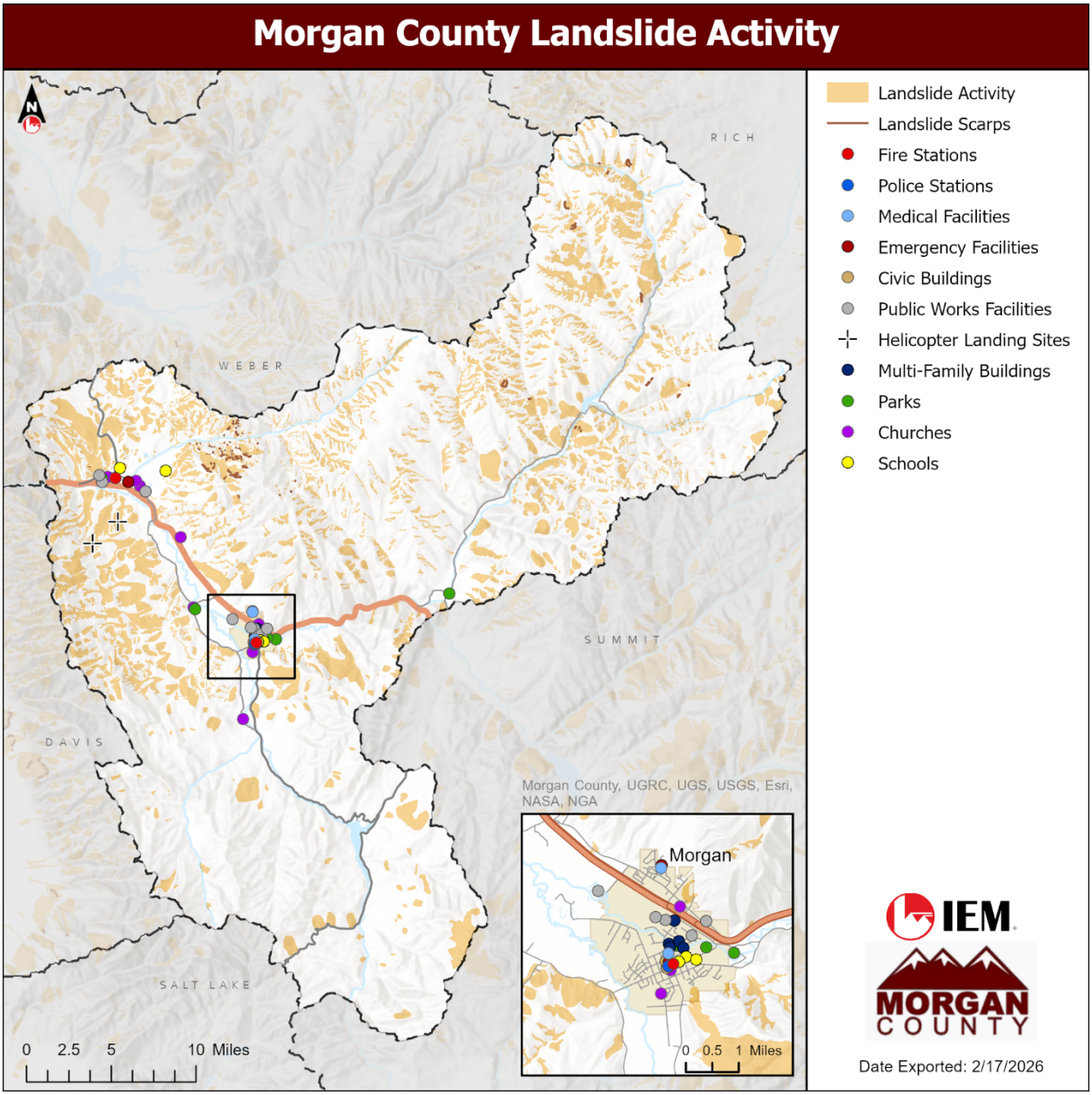


Figure 53: Landslide Activity in Morgan County

APRIL 30, 2023 – TRAPPERS LOOP BEND (SR-167)

Two landslides occurred along and near Trappers Loop Bend (SR-167) in Morgan County. They were first reported on April 30, 2023, by KSL Chopper 5. There was one large landslide and a secondary landslide.

The secondary landslide was triggered by movement at the toe of the large landslide and contained internal scarps. The type of landslide was reported as an active, slow-moving rotational landslide, measuring approximately three-fourths of a football field in width and length (235 by 250 feet) and an 11-foot headscarp (see Figure 54). There was damage to the cattle fencing, but no damage to SR-167, located above the landslide area.[113]

Figure 54: Drone Images of Trappers Loop Bend (SR-167) Rotational Landslide[114]

APRIL 14–16, 2023 – MOUNTAIN GREEN LANDSLIDE

A mudslide occurred in the area of 5500 North and Mountain Green Drive in Morgan County on Sunday, April 16. The slide was first reported moving slowly on Friday, April 14, and a hill partially collapsed two days later. The type of landslide was reported as a stable, slow-dying rotational to translational landslide, measuring half the size of a football field. The landslide location was in proximity to two homes that had to be evacuated by the residents (see Figure 55).[115]

Available records suggest that small rockfalls, slumps, and shallow slides occur nearly every year in Morgan County, particularly along canyon roads and bench slopes, while moderate-size deep-seated movements (such as the 2023 Trappers Loop and Mountain Green events) have historically occurred every several years, often following winters with high snowpack and rapid spring melt.

[113] Utah Geological Survey, "Geological Hazards-Trappers Loop Landsides, Morgan County," 2023, https://geology.utah.gov/portfolio-item/trappers-loop-landslides/.
[114] Utah Geological Survey, "Geological Hazards-Trappers Loop Landsides, Morgan County," 2023, https://geology.utah.gov/portfolio-item/trappers-loop-landslides/.
[115] Utah Geological Survey, "Utah Landslide Emergency Response Photos of Mountainview Drive Residences, April 2023," 2023, https://geology.utah.gov/portfolio-item/mountain-green-landslide/.

Figure 55: Photo of 2023 Mountain Green Landslide[116]

STATE AND FEDERAL DISASTER DECLARATIONS

A review of the FEMA Disaster Declarations Database indicates that Morgan County has not received any federal major disaster declarations specifically attributed to landslides since the previous Morgan County Hazard Mitigation Plan update. Similarly, the State of Utah has not issued a state disaster declaration specifically related to landslide impacts affecting Morgan County during this period. While localized slope failures occur periodically in the county—particularly along canyon roads and hillside developments—these incidents have generally been limited in geographic extent and have not resulted in impacts sufficient to trigger a state or federal disaster declaration.

Probability and Effects of Future Conditions

Based on historical observations, landslide susceptibility mapping, and documented recent events, the probability of landslides affecting Morgan County within the next five years is considered Likely. Local

[116] Utah Geological Survey, "Utah Landslide Emergency Response Photos of Mountainview Drive Residences, April 2023," 2023, https://geology.utah.gov/portfolio-item/mountain-green-landslide/.

records and Utah Geological Survey observations indicate that small landslides—including rockfalls, slumps, and shallow slope failures—occur somewhere in the county nearly every year, while moderate events capable of damaging roads or threatening structures occur approximately every two to five years, particularly following winters with high snowpack or intense spring runoff.

The Utah Enhanced Hazard Mitigation Plan and recent research indicate that climate change is increasing the intensity of extreme precipitation and altering the timing and type of precipitation (more rain-on-snow, earlier and faster snowmelt) across northern Utah. Warmer winters reduce the extent of frozen soils; intense rain falling on existing snowpack and unfrozen soils at low- to mid-elevations can greatly increase pore-water pressures and landslide risk, especially on slopes already mapped as susceptible.

As wildfire frequency and burn severity increase, more slopes in drainages such as East Canyon, Hardscrabble, and Lost Creek may lose the vegetation and root strength that help stabilize hillsides. Post-fire studies show that burned basins can experience significantly higher runoff and debris-flow/landslide activity for three to five years after a fire.

Continued residential and infrastructure growth on benches, canyon mouths, and valley margins expands the number of people, buildings, and lifelines exposed to landslide hazards. Cut-and-fill grading, increased irrigation, and concentrated stormwater discharge can destabilize slopes and accelerate creep or reactivation of older slides if not properly designed and monitored.

A future large earthquake on the nearby Weber segment of the Wasatch fault would likely produce widespread rockfall and trigger reactivation of dormant slides on steep slopes throughout the County. Although such events are infrequent, they represent the worst-case scenario for regional landslide magnitude and cumulative damage.

Considering mapped susceptibility, ongoing small events, changes in precipitation and snowmelt, post-fire behavior, and continued hillside development, the probability of future landslide impacts in Morgan County is high, with most events expected to produce localized but recurring damage and occasional moderate-scale failures during extreme hydrologic or seismic conditions.

The National Risk Index describes Morgan County's landslide risk as "very low" at the national scale; however, local susceptibility mapping and recent 2023 events show that slope failures remain a meaningful countywide hazard that must be managed through land use, design, and monitoring (see Figure 56).

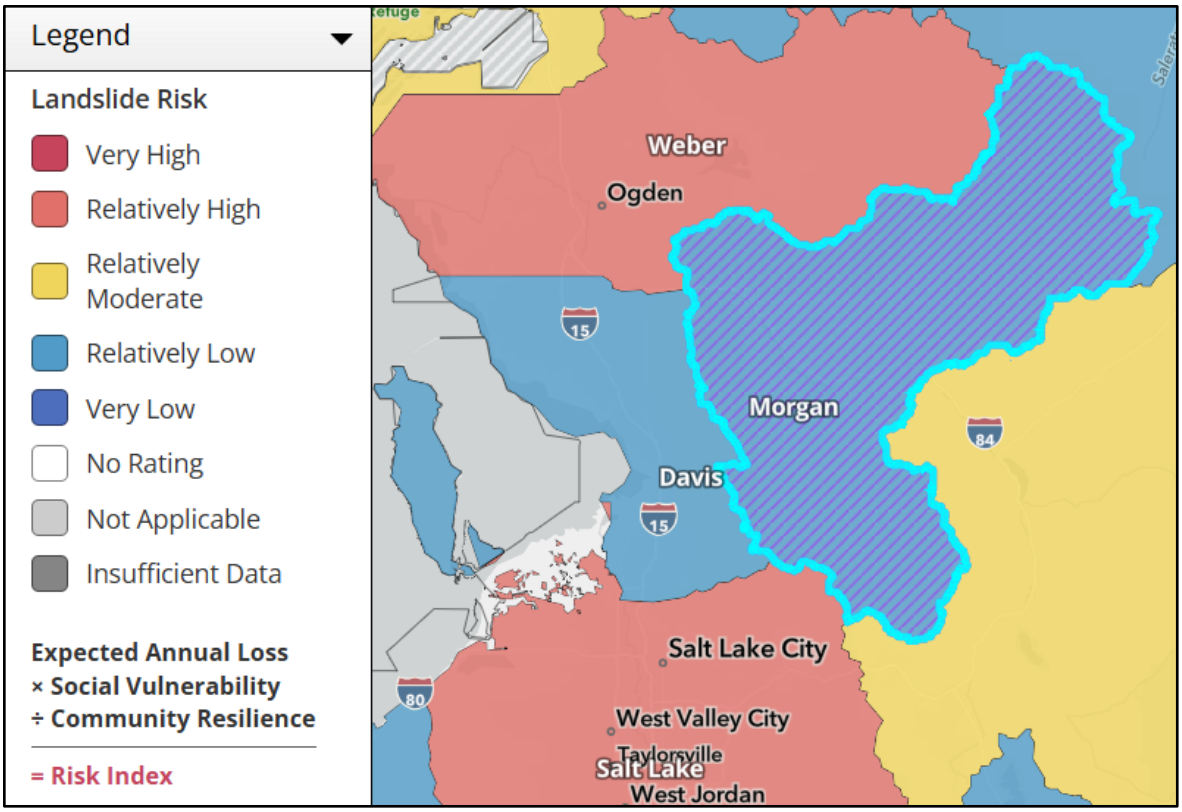


Figure 56: National Risk Index Landslide Risk Map for Morgan County[117]

[117] Federal Emergency Management Agency, National Risk Index, "Risk Map and Legend Landslide Morgan County," 2025, https://hazards.fema.gov/nri/map.

Problem Soils

Hazard Definition

Problem soils refer to specific soil conditions that pose significant challenges to land use, infrastructure stability, agricultural productivity, and environmental health. These soils exhibit a range of problematic characteristics, each of which can create unique difficulties for development and land management. Problem soil types highlighted in the Utah Enhanced Hazard Mitigation Plan are as follows:

- **Collapsible Soils:** Collapsible soils are soils that have considerable strength when in their dry, natural state, but undergo significant settlement due to hydrocompaction when wetted. They are typically associated with young alluvial fans, debris flows, and loess. These soils can cause asphalt concrete (AC) and Portland cement concrete (PCC) pavement failure, severe building and infrastructure distress due to differential movement, and the failure of canals and other gravity flow utilities.
- **Corrosive Soils:** Soil and rock that are corrosive to exposed metals and concrete can cause significant damage to these materials over time. They may cause pipe walls to become thin and weak, leading to failure, and cause pipe buried near or above surface concrete to decay and lose strength.
- **Expansive Soils:** Expansive soils contain clay minerals that expand when wet and shrink when dry. These soils can cause AC and PCC pavement failure, severe building and infrastructure distress and differential movement, and canals and other gravity flow utilities to fail.
- **Land Subsidence:** The lowering of the groundwater table in silty soils by pumping more water than is recharged annually by rain and snow often causes the ground above to sink over widespread areas. In response to subsurface geologic features, this may form distinct earth fissures or ground cracks. These features may severely damage buildings, pavements, underground utilities, and other infrastructure. Building foundations and pavements may crack, sewer and storm drainpipes may come apart or not flow downhill, and infrastructure may become uneven. Permanent, linear tension cracks in the ground may extend upward from the groundwater table and are a direct result of land subsidence caused by groundwater depletion and, in some settings, mine subsidence.
- **Soluble Soils:** Gypsum and other salt-bearing soils and rocks are subject to dissolution of the salt, which causes a loss of internal structure and volume. Where the amount of salt is greater than 10%, dissolution can result in localized land subsidence and sinkhole formation. Dissolution of salt may lead to foundation collapse and may affect roads, dikes, underground utilities, and other infrastructure.

Problem soils can cause extensive damage to structures and foundations. They can also damage pavements after construction, resulting in high maintenance and/or replacement costs, along with increased legal and financial liability due to pavement separation and/or gaps that create tripping hazards. In addition, future maintenance may disrupt business activities, resulting in increased costs and/or lost revenue. The primary problem soil identified in Morgan County is expansive soil, though other types of problem soils may also exist in localized parts of the County.

Geographic Location

Morgan County is underlain by a complex mix of soils and geologic materials that strongly influence local susceptibility to problem-soil hazards. Topography is a key control: the steep Wasatch and Uinta mountain slopes support thin, poorly developed soils, while the mountain valleys and Morgan Valley contain thicker valley-fill deposits of clay, silt, and sand derived from weathered rock. Over time, these materials have accumulated in the valley floor and benches, creating fertile but shrink–swell-prone soils where clay content is high and moisture conditions fluctuate.

Mapping from the 2021 Morgan County Pre-Disaster Mitigation Plan and Natural Resources Conservation Service (NRCS) soil surveys indicate that engineering problem soils cover almost the entire county, including both mountain and valley areas. Mountain slopes are typically limited by shallow bedrock and steep gradients, while valley-fill soils are often rated "Very Limited" for building foundations due to shrink–swell potential, flooding, and variable soil moisture conditions.

Morgan County also relies on a valley-fill aquifer fed by the Weber River and East Canyon Creek for domestic, municipal, commercial, and irrigation uses. Prolonged drought and groundwater pumping that exceeds natural recharge can lower the water table, increasing the potential for land subsidence and related ground cracking in susceptible, fine-grained deposits.

To define geologic-hazard areas—including those related to problem soils—the County relies on Utah Geological Survey (UGS) geologic-hazard maps and NRCS soil interpretations. These sources indicate that developed areas with elevated problem-soil concerns include Croydon, Porterville, and Mountain Green, where unconsolidated valley-fill deposits, benches, and slopes are vulnerable to shrink–swell movement and settlement when disturbed or subjected to significant moisture changes.

Magnitude and Severity

There is no standardized magnitude or extent scale for problem soils similar to those used for natural hazards like earthquakes or floods. However, problem soils impacts can be described and assessed based on various factors that influence their composition, severity, and consequences.

Because problem soils are widespread but vary in thickness and severity, Morgan County uses a combination of NRCS Soil Survey Geographic Database (SSURGO) soil interpretations, UGS geologic-hazard mapping, and site-specific geotechnical investigations to characterize extent. For planning purposes, soils rated "Very Limited" for buildings (with or without basements) and small commercial buildings due to shrink–swell, collapse, wetness, or shallow bedrock are treated as problem-soil areas.

Site-specific characterization uses standard geotechnical tests—such as plasticity index (Atterberg limits), swell/consolidation tests, and corrosion potential—and borings or test pits to determine soil thickness, mineralogy, and moisture sensitivity. These data inform foundation design, pavement sections, and mitigation measures (e.g., over-excavation and replacement, moisture conditioning, drainage improvements, or deep foundations).

The area of impact for problem soils in Morgan County is widespread, but the severity of damage at any given site is usually localized and develops over a period of months to years. When problem soils are not identified and mitigated, they can cause cracked and displaced foundations and slabs; doors and windows that no longer operate properly; broken water and sewer laterals; settlement or heave of sidewalks and pavements; and misaligned culverts and canals.

For most structures, individual events are of minor to moderate severity, but cumulative costs can be substantial. Repairs may require underpinning or partial reconstruction of foundations, pavement replacement, utility realignment, or regrading and drainage improvements. Because damage typically occurs gradually and is often handled as routine maintenance or as private property repairs, losses are poorly documented in traditional disaster databases, leading to an underestimation of the true economic impact.

Overall, consistent with previous state and County hazard profiles, problem-soil hazard severity in Morgan County is best characterized as "minor to serious" at the site scale, with a high probability and persistent occurrence at the County scale. Detailed laboratory protocols are beyond the scope of this plan and are addressed in separate geotechnical reports.

CRITICAL FACILITIES AND LIFELINES AT RISK

Although catastrophic failures are unlikely, problem soils can gradually undermine the performance of critical facilities and lifelines countywide. In unincorporated Morgan County alone, problem soils intersect over 400 commercial structures, more than 2,000 residences, multiple parks and public facilities, five water tanks, and 83 wells, as well as over 50 miles of roads and numerous bridges and culverts. These figures represent planning-level estimates derived from County Geographic Information System (GIS) overlays of NRCS soil ratings and infrastructure datasets and are intended to illustrate relative exposure rather than exact facility counts.

Critical facilities most at risk are those built on valley-fill deposits with high clay content or on filled ground, including schools, emergency services facilities, water and wastewater plants, and transportation corridors such as Interstate 84 and associated interchanges. Over time, expansive or collapsible soils can cause foundation settlement or heave, slab cracking, misalignment of underground utilities, and differential movement at bridge approaches—leading to safety concerns, increased maintenance costs, and potential service disruptions.

Because the hazard is widespread but chronic, Morgan County emphasizes geotechnical review for capital projects, design standards that address shrink–swell and collapse potential, and ongoing monitoring of pavement and utility performance rather than relying solely on disaster declarations to capture impacts.

Historical Occurrences

No major, documented damage events in Morgan County have been formally attributed solely to problem soils, and there are no known disaster declarations in which problem soils were the primary

hazard. However, engineering staff and the 2021 risk assessment recognize that cracked pavements, foundation settlement, and utility repairs occur regularly in problem-soil areas, yet these are typically addressed as routine maintenance or as private property issues and therefore are not captured in statewide or federal hazard databases. Statewide, UGS and NRCS report that problem soils—including expansive and collapsible soils and land subsidence—have caused a "very significant amount of infrastructure damage and resulting economic impact" in Utah.

STATE AND FEDERAL DISASTER DECLARATIONS

A review of the FEMA Disaster Declarations Database indicates that Morgan County has not received any federal major disaster declarations specifically attributed to problem soils since the previous Morgan County Hazard Mitigation Plan update. Similarly, the State of Utah has not issued a state disaster declaration specifically related to problem-soil impacts affecting Morgan County during this period.

No major, documented damage events in Morgan County have been formally attributed solely to problem soils. However, engineering staff and the 2021 risk assessment recognize that cracked pavements, foundation settlement, and utility repairs occur regularly in problem-soil areas, yet these are typically addressed as routine maintenance or as private property issues and therefore are not captured in statewide or federal hazard databases.

Probability and Effects of Future Conditions

Based on the widespread presence of expansive and collapsible soils across Morgan County and documented recurring infrastructure maintenance issues, the probability of problem-soil impacts affecting Morgan County within the next five years is considered Likely. Under the probability framework used in this plan, Likely indicates that a hazard occurs periodically and is expected to occur at least once within the next five years. Because problem soils are distributed across much of the county and are triggered by common conditions such as moisture fluctuations, irrigation, and development activities, minor impacts such as pavement cracking, foundation settlement, and utility misalignment occur on a recurring basis.

Broader factors affecting the impact of problem soils include the following:

- **Development and Land Use:** Continued residential and commercial growth in valley-fill and bench areas (e.g., Mountain Green, Enterprise, Croydon) will place more buildings, roads, and buried utilities on shrink–swell and collapse-susceptible soils. Grading, irrigation, and altered drainage patterns can change soil moisture regimes, increasing the likelihood of expansion, settlement, or subsidence beneath both new and existing structures.
- **Climate Variability (Drought and Flood):** Projected increases in temperature extremes, drought, and intense precipitation will increase the number of wet–dry cycles experienced by near-surface clays. Extended droughts can dry and shrink expansive soils, while subsequent wet periods or floods may cause rapid swelling; similar cycles can also trigger collapse of moisture-deficient collapsible deposits. These changes may increase both the frequency and magnitude of shrink–swell and settlement damage.

- **Groundwater Levels:** Long-term lowering of groundwater from pumping, especially during drought, may induce regional subsidence and earth fissuring in susceptible fine-grained deposits, while localized rises in groundwater due to irrigation or leakage can enhance swelling in expansive soils.
- **Codes, Standards, and Practices:** Adoption and enforcement of geotechnical investigation requirements, foundation and pavement design standards, and drainage/stormwater criteria can significantly reduce future damages even as exposure grows. As new UGS and NRCS data become available, Morgan County can refine zoning, building codes, and subdivision standards to discourage high-risk siting and require appropriate mitigation in problem-soil areas.

Considering the widespread distribution of problem soils, the chronic nature of associated damage, and anticipated changes in climate and development, the probability of future problem-soil impacts in Morgan County remains high, even though most individual incidents are expected to produce minor to moderate, rather than catastrophic, damage at the site scale.

Radon

Hazard Definition

Radon is a radioactive gas released from the nuclear decay process of uranium and radium, which are trace elements in many soils. The radiation emitted during radon decay is primarily alpha radiation. It is odorless, colorless, and tasteless. As radon moves up through the ground, it can enter a home through cracks and gaps in walls and floors, cavities inside walls, gaps around service pipes, and water supply connections. Figure 57 illustrates several ways radon can enter the home.[118]

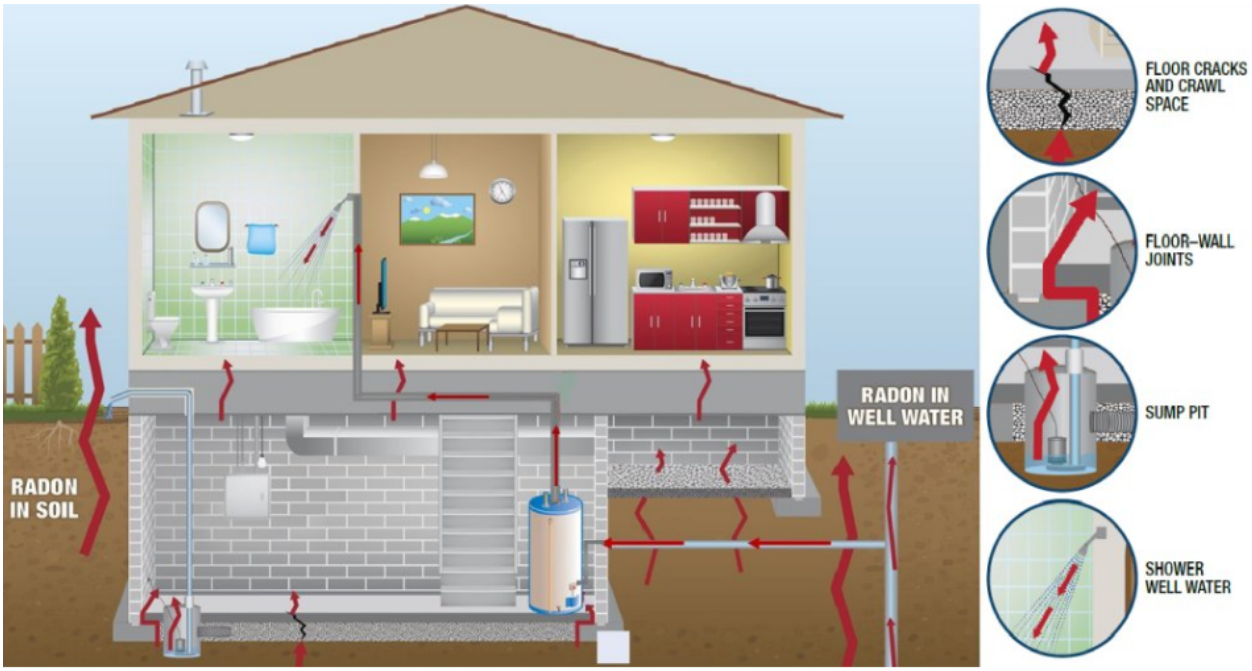


Figure 57: How Radon Enters a Home [119]

Though relatively harmless at low levels, radon is classified by the U.S. Environmental Protection Agency (EPA) as a known human carcinogen and is considered the leading cause of non-smoking lung cancer in the United States. Small radioactive particles are inhaled and lodged in the lungs, damaging DNA.

Because radon is tasteless, odorless, and invisible, it presents unique challenges in minimizing daily exposure to this naturally occurring radiation. Radon is treated by the Federal Emergency Management Agency (FEMA) and EPA as a chronic indoor environmental hazard (not a disaster-declaration hazard); management relies on testing, mitigation systems, and radon-resistant new construction and code enforcement.

[118] World Health Organization, "Radon," 2023, https://www.who.int/news-room/fact-sheets/detail/radon-and-health/.
[119] Environmental Protection Agency, "Radon Can Enter Your Home in Many Ways," 2021, https://www.epa.gov/system/files/styles/huge/private/images/2021-10/how-radon-enters-home.jpg?itok=yhnoFgEF.

Nearly 21,000 deaths in the United States each year are caused by radon gas, according to the EPA and the Centers for Disease Control and Prevention (CDC).[120] Since 2005, the Office of the Surgeon General has warned the public of the dangers of radon, especially its cancer-causing potential. [121] The EPA recommends fixing homes at levels greater than or equal to 4 picocuries per liter (pCi/L) and considering fixes at 2–4 pCi/L; the World Health Organization's (WHO) reference level is 2.7 pCi/L. Radon can be detected through an inexpensive test and can be mitigated through proper ventilation and installation of systems to prevent radon from entering the home.

Geographic Location

Radon is a naturally occurring radioactive gas that is created when uranium decays. Utah has high levels of uranium in the ground, leading to high levels of radon throughout the state.[122] One in three homes in Utah has elevated radon levels.[123] Long-term exposure to high levels of radon indoors can lead to serious health risks, including lung cancer. In fact, 21,000 Americans—and an estimated 200 to 300 Utahns—die annually from radon-induced lung cancer (see Figure 58).[124] The danger of high exposure to radon in mines was known back in the 1500s, yet the presence of radon in indoor air was not documented until 1950. Finally, in 1970, research was initiated to address sources of indoor radon, determinants of concentration, health effects, and approaches to mitigation. Radon gas is easily dissolved in water and is released into the air during water use and movement. High levels of radon are not common in Utah's public water supplies but may be present in well water.[125]

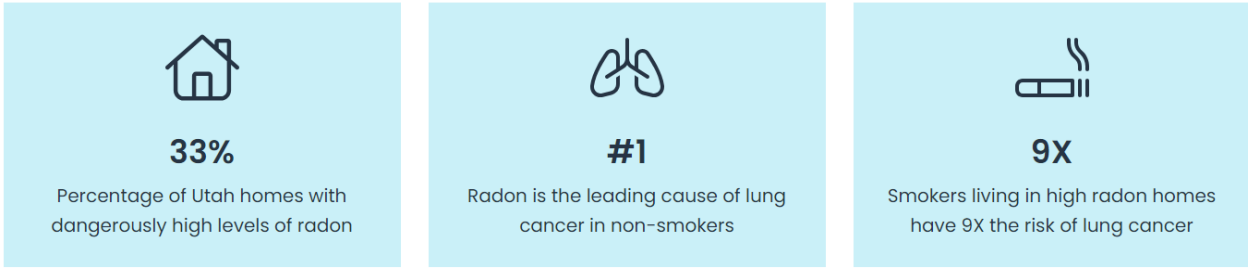


Figure 58: Utah Radon Statistics[126]

Elevated radon potential exists throughout Morgan County, with the highest readings typically along valley margins, foothills, and areas underlain by shale and sandstone formations where uranium decay products and permeable soils facilitate soil-gas entry into buildings. Most of the County is in EPA Zone 2

[120] United States Environmental Protection Agency, "Health Risk of Radon," https://www.epa.gov/radon/health-risk-radon.
[121] United States Department of Health and Human Services, Office of the Surgeon General, "Health Risk of Radon," https://www.hhs.gov/surgeongeneral/reports-and-publications/healthy-homes/index.html.
[122] UtahRadon.org, 2024, "Radon Levels in Utah," https://utahradon.org/.
[123] Utah Department of Environmental Quality, "Radon Program," 2025, https://deq.utah.gov/waste-management-and-radiation-control/radon/radon-program.
[124] UtahRadon.org, 2024, "Radon Levels in Utah," https://utahradon.org/.
[125] Utah Geological Survey, "Radon Gas Hazards," 2025, https://geology.utah.gov/hazards/problem-soils/radon/.
[126] UtahRadon.org, 2024, "Working to Protect Utahns from the Dangers of Radon.", https://utahradon.org/.

(2–4 pCi/L). Indoor concentrations depend on both geologic conditions and building construction, including pressure differentials.

Figure 59 shows that Morgan County falls within Zone 2 (yellow), indicating a moderate potential radon risk. Zone 2 corresponds to a predicted average indoor radon screening level between 2 and 4 pCi/L.[127]

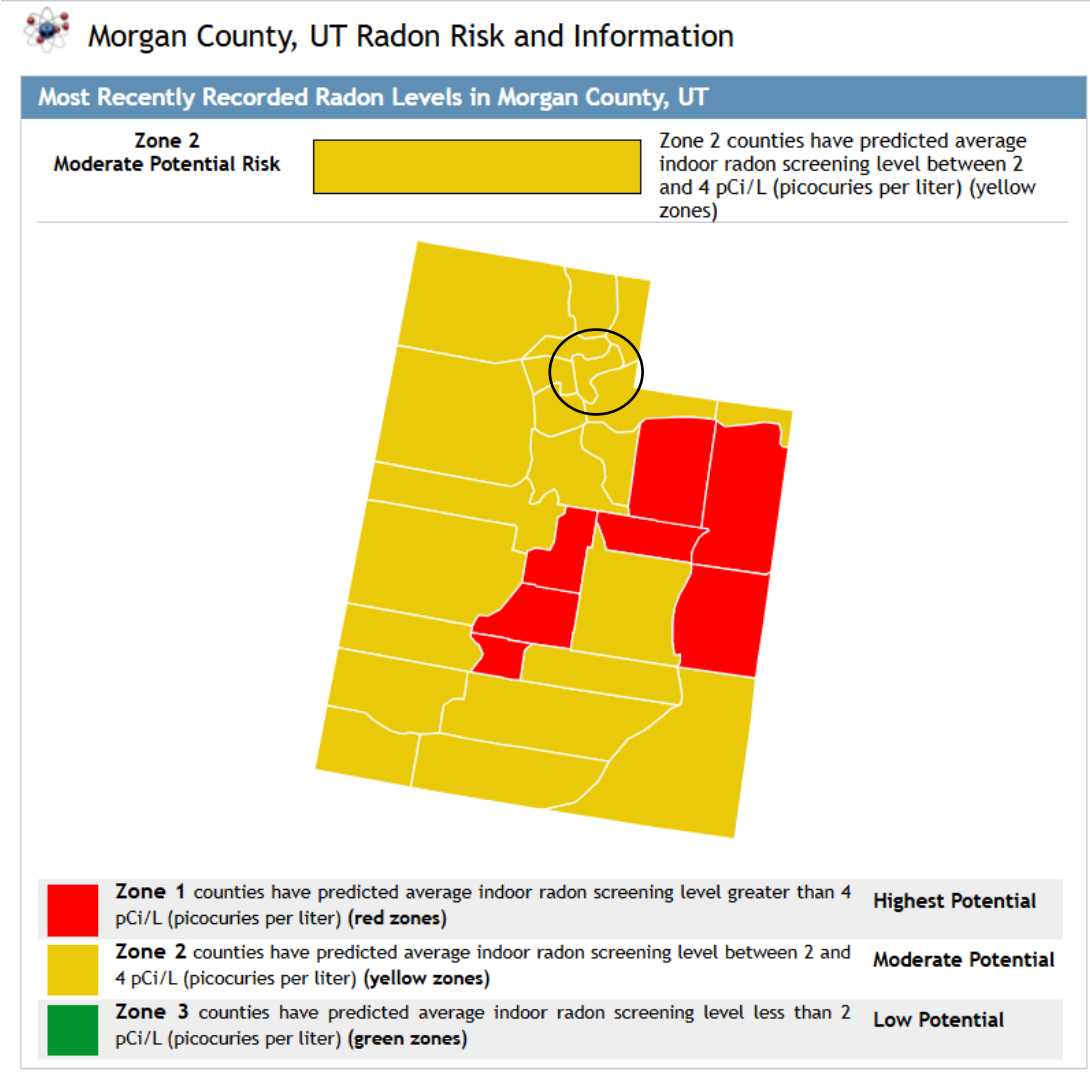


Figure 59: Recent Recorded Radon Levels in Utah, Morgan County Circled[128]

[127] HomeFacts, "Most Recently Recorded Radon Levels in Morgan County, UT," 2025, https://www.homefacts.com/radon/Utah/Morgan-County.html.
\][128] HomeFacts, "Most Recently Recorded Radon Levels in Morgan County, UT," 2025, https://www.homefacts.com/radon/Utah/Morgan-County.html

Magnitude and Severity

Radon presents a significant chronic health hazard rather than an acute event risk. Extent can be measured in terms of the concentration of radon. At the national level, the EPA estimates that radon exposure accounts for approximately 21,000 lung cancer deaths annually in the United States, making it the second leading cause of lung cancer after smoking. In Morgan County, recent test data show an average indoor radon concentration of about 6.8 pCi/L, which is more than double the WHO reference level (~2.7 pCi/L) and significantly above the EPA action level of 4 pCi/L. Moreover, statewide Utah data indicate that roughly 42% of homes tested had radon levels at or above 4 pCi/L. Given Morgan County's geology, housing patterns, and testing results, the likely proportion of homes at or above 4 pCi/L is similar or possibly higher, indicating elevated exposure potential.

From a human health severity standpoint, this chronic exposure translates into a substantial lifetime risk of lung cancer. While a home with radon at 4 pCi/L carries a lower individual risk than one with 10 pCi/L, the fact that many homes in the County exceed the 4 pCi/L threshold means that, cumulatively, the health burden is high. The County's elevated average figure and the high percentage of homes likely above the action level justify classifying radon hazard severity as high (chronic health risk). Although radon does not typically damage infrastructure or cause immediate structural collapse, the long-term societal and economic costs—through illness, treatment, lost productivity, and potential liability—are significant. In addition, since most structures (residential, schools, public buildings) in the County could be exposed, the spatial extent of the risk is large, and the time frame of impact spans decades rather than days or years, amplifying the severity.

Historical Occurrences

Radon does not typically generate discrete "events" like a flood or wildfire, so historical occurrence in the context of this hazard is best described as the accumulation of elevated indoor concentrations over time, documented test-data trends, and associated health-outcome estimates rather than single-incident declarations.

In Utah, the geological and indoor-air record clearly shows radon to be one of the state's most serious geologic-hazard health burdens. According to the Utah Geological Survey, between 1973 and 2015, an estimated 5,630 Utah fatalities were attributable to lung cancer caused by radon gas. More recent reporting extends that number to about 6,278 fatalities between 1973 and 2019. Statewide testing data (e.g., from the Utah Department of Environmental Quality [DEQ] and associated tracking systems) show that radon testing remains underutilized and levels remain elevated: one state report indicates that one in three Utah homes tests above the EPA action level of 4 pCi/L.

Focusing specifically on Morgan County, the most current publicly available summary data indicate an average indoor radon level of approximately 6.8 pCi/L—placing the County among the top 10 in Utah for elevated average radon concentrations. While detailed year-by-year trend data for Morgan County (e.g., percent of homes ≥4 pCi/L over time) are limited in the public domain, the existence of this elevated

average suggests a persistent exposure pattern. Local County communications similarly affirm "one in three Utah homes have high radon levels" and encourage testing in Morgan County.

Furthermore, the availability of short-term test-result datasets by ZIP code and County via the Utah DEQ "Test Results by ZIP Code" portal shows that while the raw numbers of tests may vary yearly, the concentration distributions consistently show a substantial share of homes above action levels. The County's inclusion in the state's radon data narrative—for example, the "Northern Utah" summary noting Morgan's 6.8 pCi/L average—underscores the historic significance of the hazard in this area.

Table 38: Radon-Attributable Fatalities in Utah Since 1973[129]

Year	Fatalities[a]
1973–2001	1460[b]
2002–2011	3816[c]
2012	98[b]
2013	87[b]
2014	87[b]
2015	90[b]
Total	**5638**

[a] Limited data are available and rely on various assumptions; the exact number of fatalities is unknown.

[b] Based on the World Health Organization estimate that 14% of lung cancer cases are attributable to radon gas (Sasha Zaharoff, Utah Department of Health), and data from https://ibis.utah.gov/epht-view/query/selection/radon/RadonSelection.html

[c] Utah Environmental Public Health Tracking Network.

The test results by ZIP code, provided by the Utah DEQ, are displayed in Figure 60. Although individual test results may vary, over 52% of tests in the area have shown concentrations above the 4 pCi/L threshold. The map also reports the average and maximum radon levels in each ZIP code within Morgan County. Tests in ZIP code 84018 indicate both high maximum and average values; however, it is not clear from the data provided how many tests were conducted in this ZIP code or whether the results may have been skewed by a small sample size.

STATE AND FEDERAL DISASTER DECLARATIONS

A review of the FEMA Disaster Declarations Database indicates that Morgan County has not received any federal major disaster declarations specifically attributed to radon exposure since the previous Morgan County Hazard Mitigation Plan update. Similarly, the State of Utah has not issued a state disaster declaration specifically related to radon exposure affecting Morgan County during this period. Radon is

[129] Utah Geological Survey, "Cost of Geological Hazards," 2025, https://geology.utah.gov/hazards/problem-soils/radon/.

recognized by FEMA and the U.S. Environmental Protection Agency (EPA) as a chronic indoor environmental health hazard rather than an event-based disaster, and therefore impacts are generally addressed through public health programs, testing initiatives, building codes, and mitigation systems rather than through disaster declarations.

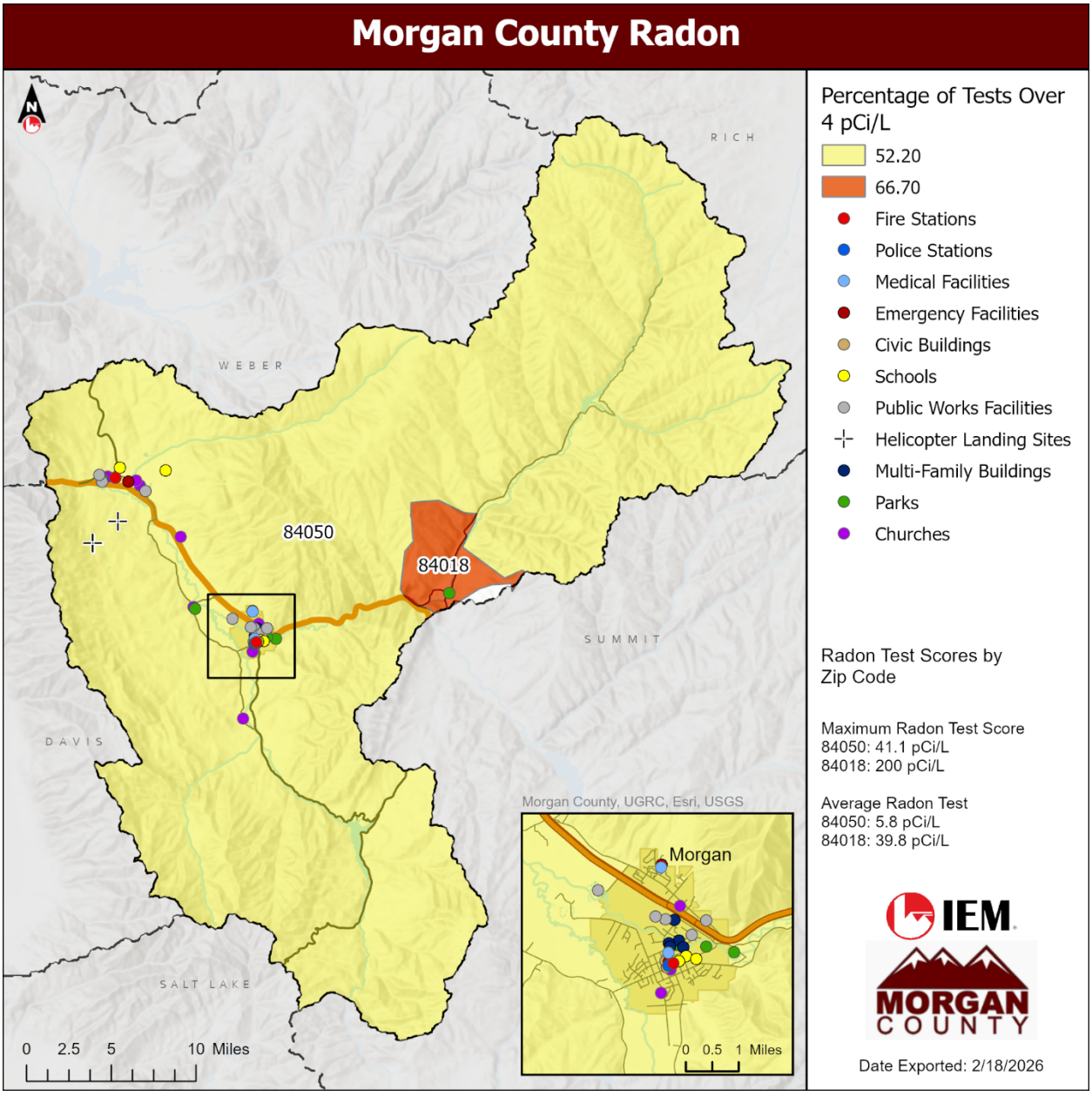


Figure 60: Morgan County Radon Levels by ZIP Code

Probability and Effects of Future Conditions

Radon is a persistent indoor environmental hazard rather than a discrete event. Based on statewide testing data, geologic conditions, and documented indoor radon concentrations, the probability of elevated radon exposure affecting Morgan County within the next five years is considered Likely. Because radon is continuously generated from uranium-bearing soils and rocks and can enter buildings through common foundation openings, elevated indoor concentrations occur regularly across Utah and are expected to continue affecting a significant portion of homes and structures in Morgan County.

In Morgan County, the likelihood of continued elevated radon exposure remains high. Current testing and countywide averages indicate that many structures exceed the key benchmark of 4 pCi/L. Without significant improvements in testing, mitigation, and radon-resistant new construction (RRNC), the number of exposed households will likely increase—driven by increased housing stock, more finished basements, and expanded development into high-radon-potential areas.

Several future-condition factors will amplify the hazard:

- **Building and housing stock growth in high-potential zones:** As development continues (especially in valley margins, foothills, and new subdivisions where geological conditions favor radon entry), more residences will be built on terrain with high radon-generation potential. Without mandatory RRNC requirements or consistent testing protocols, these new homes may add to the pool of high-radon dwellings.
- **Energy efficiency and tighter building envelopes:** Modern building practices lean toward improved insulation, sealed windows and doors, and controlled HVAC (heating, ventilation, and air conditioning) systems. While beneficial for energy conservation, these features reduce natural ventilation and may increase indoor radon concentrations unless radon-specific design or mitigation features are incorporated. Research shows that as buildings become more airtight, radon infiltration rates and accumulation can increase.
- **Climate and environmental change influences:** Emerging studies indicate that climate-driven changes—such as warming soils, fluctuating soil moisture, altered precipitation and groundwater tables, and shifts in heating/ventilation practices—may increase radon mobility from the soil into buildings, or change indoor pressure regimes to favor radon intrusion. For example, warmer soil temperatures can enhance radon emanation; drier soils or changing moisture conditions can increase gas flow pathways. In Morgan County, as climate projections suggest warmer winters and more variable precipitation patterns, the interplay of these changes with indoor-air systems and foundation conditions warrants attention.
- **Occupant behavior and zoning shifts:** If homes are used differently (e.g., greater basement occupancy due to thermal comfort, increased occupancy during certain seasons, or remote-work trends leading to higher exposure time indoors), cumulative radon dose could increase. Also, if growth pushes more housing into foothill or backcountry zones where radon potential may be higher, the hazard footprint expands.

- **Policy/regulation and mitigation uptake:** The future condition of radon risk is heavily dependent on access to mitigation, participation in testing and mitigation programs, building code upgrades (RRNC), and public awareness. If Morgan County enhances outreach, subsidizes testing and mitigation, and updates codes, exposure will reduce; conversely, policy stagnation and low participation will lead to growing risk.

Given these factors, the interpreted future-condition risk in Morgan County is that both the *number of structures with high radon levels* and the *potential for cumulative exposure* will increase unless active mitigation efforts and regulatory or behavioral controls are strengthened. Accordingly, from a planning perspective, the County should treat radon not as a static hazard, but as one whose scope and scale are increasing over time.

Assuming the County housing stock increases by about 1% per year, and that current test data suggest approximately 40% of homes may exceed 4 pCi/L (County estimate; see Figure 61), then over 10 years the number of homes with elevated radon could increase by about 10% (without mitigation) simply due to growth—meaning the at-risk population could expand. If average indoor levels in new, tighter homes rise by 10% to 20% (based on studies of building-envelope effects), the lifetime exposure and risk burden per dwelling could likewise increase, potentially resulting in a higher incidence of radon-related lung cancer over the long term (see Figure 62).

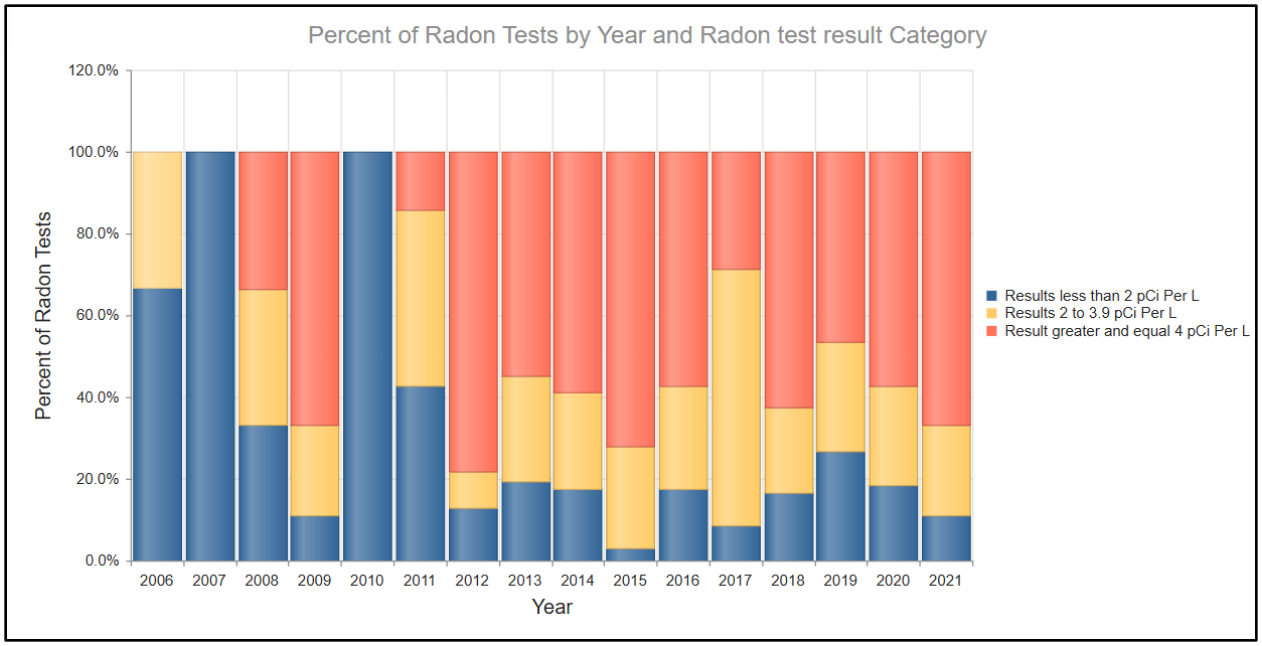


Figure 61: Morgan County Percent of Radon Tests by Year and Test Results[130]

[130] Utah Environmental Public Health Tracking, "Morgan County Query Results for Number of Radon Tests," 2025, https://ibis.utah.gov/epht-view/query/result/radon/RadonNumberTest/Percent.html.

Lung cancer fatalities caused by radon gas are Utah's most deadly geologic hazard. Radon-related deaths account for 97 percent of all geologic hazard fatalities in Utah.

Figure 62: Utah Lung Cancer Deaths Attributable to Radon[131]

[131] Utah Geological Survey, "Cost of Geological Hazards," 2025, https://geology.utah.gov/hazards/problem-soils/radon/.

Snowstorm

Hazard Definition

Snowstorms are a form of winter weather event characterized by the accumulation of snow that creates hazardous conditions for people, property, and infrastructure.[132] Snowflakes form when ice crystals in the atmosphere adhere to one another and fall to the ground while temperatures remain at or below 32°F from the cloud base to the surface. The severity of a snowstorm depends on its intensity, duration, and the combination of accompanying weather elements such as wind, temperature, and ice, all of which can produce dangerous conditions during and after the event.

Operationally, Morgan County references National Weather Service (NWS) winter hazard criteria[133]—for example, blizzard conditions defined by visibility of ¼ mile or less for three or more hours—and applies the Winter Storm Severity Index (WSSI) to anticipate combined impacts from snowfall rate and accumulation, snow load, ice accretion, blowing snow, flash-freeze, and ground-blizzard conditions.

INTENSITY

Snowstorms typically feature snowfall rates of at least 1 inch per hour, though rates can reach or exceed 3 inches per hour during heavy precipitation, causing rapid accumulation and near-zero visibility.[134] Total snowfall may range from a few inches to several feet, with the most severe events depositing 12 inches or more within 24 to 48 hours. Local topography and microclimates across Morgan County can produce wide variations in snowfall depth and wind effects.

DURATION

Storm duration can vary from a few hours of intense snow to multiday events that cause cumulative impacts to infrastructure, transportation, and emergency response. Prolonged snowstorms often lead to secondary hazards such as flooding during rapid snowmelt or ice jams when temperatures rise.

ACCOMPANYING WEATHER CONDITIONS

Snowstorms are often accompanied by strong winds, cold temperatures, and occasionally freezing rain. High winds can create blowing and drifting snow, reducing visibility and making travel hazardous. Cold temperatures can increase health risks such as frostbite and hypothermia and cause roads and utilities to

[132] National Oceanic and Atmospheric Administration, "Severe Weather 101 – Winter Weather," n.d., https://www.nssl.noaa.gov/education/svrwx101/winter/types/#:~:text=Winter%20Storms,resulting%20in%20very%20low%20visibilities.
[133] National Weather Service, "Criteria for Winter Storm Watches/Warnings and Winter Weather Advisories," n.d., https://www.weather.gov/media/meg/WinterStormCriteriaMEG.pdf
[134] The Weather Channel, "What is Heavy Snow?," 2025, https://weather.com/storms/winter/news/2025-01-14-winter-storm-heavy-snow-snowfall-rates.

freeze, complicating response and recovery. When mixed with freezing rain, snowstorms can produce ice accretion on trees, power lines, and roads, increasing the risk of power outages, structural damage, and accidents.

TYPES OF SNOWSTORMS

- **Blizzards:** Sustained winds of 35 mph or greater with falling or blowing snow that reduces visibility to less than ¼ mile for at least 3 hours.[135]
- **Blowing Snow:** Wind-driven snow that reduces visibility and creates snowdrifts, consisting of newly fallen or previously accumulated snow.
- **Snow Squalls:** Short-lived but intense snow bursts with strong, gusty winds that cause sudden whiteout conditions and dangerous road icing.
- **Snow Showers:** Periods of snow of variable intensity and duration, typically producing light to moderate accumulation.
- **Snow Flurries:** Light, intermittent snow with minimal or no accumulation.

Geographic Location

Snowstorms occur throughout Morgan County each winter, but their frequency, intensity, and impacts vary strongly with elevation and topography. The county lies within the Northern Utah mountain region, where Pacific storm systems and lake-effect bands from the Great Salt Lake combine to produce some of the highest snowfalls in the Intermountain West.

The Weber River Valley, which includes Morgan City and the main transportation corridor, Interstate 84 (I-84), generally receives 55–70 inches of snow per year[136], while surrounding benches and canyon slopes may accumulate much more. Elevations above 7,000 feet—such as Trappers Loop (SR-167), East Canyon, and the Wasatch Back ridge-tops—routinely experience deep snowpack, strong winds, and rapid drift formation. In contrast, the valley floor and lower elevations experience more moderate totals but remain highly vulnerable to travel disruptions, roadway icing, and infrastructure stress during intense events.

Prevailing weather patterns funnel moisture-laden air eastward from the Great Basin. When these systems encounter the Wasatch Range, orographic lift intensifies snowfall on the west- and south-facing slopes bordering Morgan County. The combination of steep terrain and narrow canyon corridors channels strong winds that frequently cause blowing and drifting snow, whiteout conditions, and temporary closures along I-84, SR-66, and SR-167.

Snow-storm exposure also extends to the county's utilities and built environment. Overhead power and communication lines in open valley areas and canyon approaches are prone to ice and snow loading,

[135] National Oceanic and Atmospheric Administration, "Severe Weather 101 – Winter Weather," n.d., https://www.nssl.noaa.gov/education/svrwx101/winter/types/#:~:text=Winter%20Storms,resulting%20in%20very%20low%20visibilities.
[136] National Weather Service, "NOWData," 2026, https://www.weather.gov/wrh/Climate?wfo=slc.

while older flat-roof structures in Morgan City and unincorporated communities have shown sensitivity to snow-load accumulation. Rural roads and steep driveways in higher-elevation subdivisions often become isolated during multiday storms until plowing is complete, affecting emergency response access.

From a spatial-planning standpoint, the entire county is susceptible to snowstorm impacts, but risk gradients can be broadly summarized as follows:

- **High-Risk Zones:** Canyon mouths (Weber Canyon, East Canyon), upper benches, and mountain passes where heavy snowfall, drifting, and wind exposure coincide.
- **Moderate-Risk Zones:** Valley floors and populated areas such as Morgan City and Peterson, where travel and infrastructure effects are greatest though snowfall totals are lower.
- **Lower-Risk Zones:** Limited to small southern valley pockets with slightly milder temperatures, yet still subject to freezing rain and icy conditions during mixed-phase storms.

Magnitude and Severity

Snowstorms in Morgan County range from minor events producing a few inches of accumulation to severe, multiday storms that cause widespread disruption of transportation, utilities, and essential services. Magnitude is determined by the combination of snowfall rate and total accumulation, duration, wind intensity, temperature, and secondary hazards such as ice accretion and flash-freeze conditions. Collectively, these elements determine how the event is classified within the NWS WSSI, which Morgan County and regional partners use operationally to gauge impact levels and prioritize response.

QUANTITATIVE INDICATORS AND TYPICAL RANGES

NOAA/NCEI 1991–2020 station normals illustrate strong snowfall–elevation gradients across northern Utah that are representative of conditions influencing Morgan County[137]. For example, the Snydersville station (6,485 ft), located in the Wasatch Back region, records an average of 152.9 inches of snowfall annually (1991–2020), while lower-elevation stations in northern Utah record substantially lower annual snowfall totals[138]. These patterns reflect the pronounced influence of elevation and orographic enhancement affecting Morgan County's bench and canyon areas.

Localized lake-effect and orographic snow events can yield 6–12 inches of snowfall within 12 hours or less, particularly along transportation corridors such as Weber Canyon and Trappers Loop (SR-167), where

[137] National Oceanic and Atmospheric Administration (NOAA), National Centers for Environmental Information (NCEI), "Summary of Monthly Normals (1991–2020) – Station: SNYDERVILLE, UT US (USC00427942)", 1991–2020, https://www.ncei.noaa.gov/access/services/data/v1?dataset=normals-monthly-1991-2020&endDate=9996-12-31&format=pdf&startDate=0001-01-01&stations=USC00427942

[138] National Centers for Environmental Information (NCEI), "Summary of Monthly Normals (1991–2020) – Station: BLACK ROCK, UT US (USC00420730)", 1991–2020, https://www.ncei.noaa.gov/access/services/data/v1?dataTypes=MLY-TMAX-NORMAL%2CMLY-TMIN-NORMAL%2CMLY-TAVG-NORMAL%2CMLY-PRCP-NORMAL%2CMLY-SNOW-NORMAL&dataset=normals-monthly-1991-2020&format=pdf&stations=USC00420730

terrain-induced uplift is common.[139] Isolated, topographically enhanced convective snow bands may occasionally produce several inches of accumulation within a 24-hour period. During the 2023–2024 winter season, Morgan County experienced a notable multiday snowfall episode, with three-day accumulations exceeding 24 inches in upper bench and foothill areas, resulting in multiple Interstate-84 travel restrictions and brief, localized power outages.

Within the Winter Storm Severity Index (WSSI) framework, most winter storm events affecting Morgan County fall within the Minor to Moderate impact categories, typically producing short-duration travel disruptions, school delays, and temporary road controls. However, approximately two to four storms per winter reach Major impact levels, characterized by multiday snowfall accumulation, sustained winds exceeding 25 mph, and intermittent ice accretion on trees or utility infrastructure. On average, one Extreme-impact winter storm occurs every 5–7 years. For example, February 2023 featured a major regional winter storm sequence affecting northern Utah, producing substantial mountain snowfall, prolonged transportation disruptions, and elevated emergency response demands across the Wasatch Front and adjacent counties.

SNOW LOAD, ICE, AND STRUCTURAL STRESS

At low temperatures (≤25°F), snow water equivalent (SWE) values typically range from 0.10–0.20 inches per inch of snow, producing roof loads of 10–20 pounds per square foot (psf) in most events. During warmer storms with high moisture content, SWE can exceed 0.25 inches, doubling loads to 25–30 psf and increasing the risk of roof failure, particularly on older flat-roof commercial structures and metal outbuildings. Ice accretion of 0.25 inches or greater can damage trees and utility lines, compounding outages and emergency calls.

HUMAN, INFRASTRUCTURE, AND ECONOMIC CONSEQUENCES

Even moderate-magnitude snowstorms can have outsized human and economic effects because of the county's topography and transportation dependencies. Heavy snowfall and blowing snow on I-84 and SR-167 routinely trigger temporary closures and detours, affecting freight movement and commuter access between Morgan, Weber, and Davis counties. Power outages from snow or ice loads disrupt heating and communication, posing risks to medically dependent and elderly residents. Agricultural and commercial losses stem from delayed transport and structural damage to outbuildings or greenhouses. When snowmelt follows prolonged cold periods, flooding and ice jams can occur, particularly along the Weber River and East Canyon Creek.

From a public safety perspective, severity also reflects exposure duration. Prolonged storms with consecutive days of subfreezing temperatures elevate risks of vehicle accidents, hypothermia, and frostbite, while hampering emergency response due to blocked or narrowed roadways. The 2023 storms

[139] National Oceanic and Atmospheric Administration (NOAA), National Centers for Environmental Information (NCEI), "Storm Events Database", 2025 (database current through October 2025 as posted), https://www.ncei.noaa.gov/stormevents/

demonstrated how multiday duration magnifies cascading impacts—delayed fuel deliveries, canceled school and work operations, and higher overtime and equipment costs for snow removal.
NWS's WSSI combines several measures of snow and ice impacts into a single score. This score helps to communicate when multiple winter storm factors combine to create a hazardous situation. See Table 39 for the descriptors of WSSI levels and

Table 40 for a description of the six components of WSSI.

Table 39: WSSI Descriptors and Severity Impacts[140]

WSSI Descriptor	General Description of Expected Storm Severity Impacts
None	No snow or ice forecast. No potential for ground blizzard conditions.
Limited	Small accumulations of snow or ice forecast. Minimal impacts, if any expected. In general, society goes about their normal routine.
Minor	Roughly equated to NWS Advisory Level criteria. Minor disruptions, primarily to those who were not prepared. None to minimal recovery time needed.
Moderate	Roughly equated to a NWS Warning Level criteria. Definite impacts to those with little preparation. Perhaps a day or two of recovery time for snow and/or ice accumulation events.
Major	Significant impacts, even with preparation. Typically several days of recovery time for snow and/or ice accumulation events.
Extreme	Historic, widespread severe impacts. Many days to a week of recovery needed for snow and/or ice accumulation events.

Table 40: WSSI Components[141]

Index Components	Description
Snow Load	Snow Load Index indicates potential infrastructure impacts (e.g., downed trees/power lines) due to the weight of the snow.
Snow Amount	Snow Amount Index indicates potential impacts due to the total amount of snow or the snow accumulation rate.
Ice Accumulation	Ice Accumulation indicates potential infrastructure impacts (e.g., downed trees/power lines, roads/bridges) due to combined effects and severity of ice and wind.

[140] National Weather Service, "Winter Storm Severity Index (WSSI) Website Tutorial," 2019, https://www.weather.gov/gjt/WSSI_Tutorial#:~:text=The%205%20levels%20are%20given,Moderate%2C%20Major%2C%20and%20Extreme.&text=Six%20components%20of%20the%20WSSI,impact%20from%20these%20individual%20components.
[141] National Weather Service, "Winter Storm Severity Index Website Tutorial," 2019, https://www.weather.gov/gjt/WSSI_Tutorial.

Index Components	Description
Blowing Snow	Blowing Snow Index indicates the potential disruption due to blowing and drifting snow.
Flash Freeze	Flash Freeze Index indicates the potential impacts of flash freezing (temperatures starting above freezing and quickly dropping below freezing) during or after precipitation events.
Ground Blizzard	Ground Blizzard indicates the potential travel-related impacts of strong winds interacting with preexisting snow cover.

Historical Occurrences

While Morgan County routinely experiences substantial snowfall each winter, the number of recorded injuries, fatalities, and significant property losses remains relatively low compared with the frequency of events. According to the National Centers for Environmental Information (NCEI) Storm Events Database, between January 2000 and June 2025, the county experienced 315 days of reported winter storm or heavy snow conditions, resulting in 11 injuries, no fatalities, and approximately $1.8 million in property damage with an additional $20,000 in crop losses (see Table 41). Averaged over the 25-year period, this equates to roughly $72,000 in property damage per year, underscoring that while snowstorms are frequent, most impacts are minor to moderate and highly localized.

Although overall losses are modest, certain recent events have demonstrated the county's exposure to more severe outcomes. In February–March 2023, successive snowstorms delivered between 6 and 7 feet of total accumulation across higher-elevation communities such as Mountain Green, Milton, and Peterson. On March 3–5, 2023, a particularly heavy, wet snow caused structural failures in three Mountain Green homes—two residential roofs partially collapsed under snow loads exceeding 30 pounds per square foot, while a third structure suffered complete roof failure that ruptured a natural gas line. Emergency responders contained the leak and prevented injury, but all three homes were rendered temporarily uninhabitable. County Public Works logged record high plowing hours and debris removal in March 2023, illustrating the cascading operational costs of prolonged storms.

Long-term data show that Morgan County's storm damages are typically tied to transportation disruption, power outages, and snow-load stress, rather than large-scale catastrophic losses. The I-84 corridor through Weber Canyon frequently experiences temporary closures due to drifting and whiteout conditions, and while these do not appear as property losses in federal databases, they represent recurring economic impacts through delayed freight and commuter movement. Power outage data from Rocky Mountain Power and the County's emergency management logs confirm several multi-hour outages each winter, most associated with heavy, wet snow, and tree limb breakage on distribution lines.

Morgan County has not been included in a federally declared disaster related to snow or winter weather to date. However, similar events in nearby jurisdictions underscore the regional significance of the hazard. For example, in 2017 (FEMA DR-4311-UT), Box Elder and Cache Counties—just north of Morgan—were declared disaster areas due to an unusual sequence of heavy snow and ice followed by rapid warming

that caused flooding and infrastructure damage. Given Morgan County's comparable topography and climate, a similar combination of deep snowpack and rapid melt could produce comparable cascading impacts locally.

Table 41: Summary of Snowstorm Events 2000–2025[142]

Type of Event	Injuries	Fatalities	Property Damage	Crop Damage	Number of Days
Winter Storm	2	0	$475,000	$20,000	142
Heavy Snow	9	0	$1,320,000	$0	173
Totals	**11**	**0**	**$1,795,000**	**$20,000**	**315**

STATE AND FEDERAL DISASTER DECLARATIONS

A review of the FEMA Disaster Declarations Database indicates that Morgan County has not received any federal major disaster declarations related to snowstorms or winter weather since the previous Morgan County Hazard Mitigation Plan update. Similarly, the State of Utah has not issued a state disaster declaration specifically related to snowstorm impacts affecting Morgan County during this period. Although heavy snowfall events occur regularly, most impacts are managed through routine snow removal, transportation management, and emergency response operations rather than through state or federal disaster assistance programs.

Probability and Effects of Future Conditions

Based on historical climate records and the regular occurrence of winter storm conditions in northern Utah, the probability of snowstorms affecting Morgan County within the next five years is considered Highly Likely. Snowstorms occur every winter in Morgan County, although most events produce limited damage and are managed through routine winter maintenance and emergency response activities. However, larger storms capable of producing significant snowfall accumulation, transportation disruptions, and structural snow-load impacts typically occur every several years.

INFLUENCES ON FUTURE PROBABILITY

- **Climate Variability:** Climate change is leading to more variability in the snow fall in Morgan County. Winter temperatures are becoming warmer, on average, but severe snowstorms may become more intense and less frequent. This could lead to increased damages during snowstorms but longer periods between when those storms occur.

[142] National Centers for Environmental Information, "Storm Events Database," 2025, https://www.ncei.noaa.gov/stormevents/listevents.jsp?eventType=%28Z%29+Winter+Storm&beginDate_mm=01&beginDate_dd=01&beginDate_yyyy=2000&endDate_mm=05&endDate_dd=31&endDate_yyyy=2025&county=MORGAN%3A29&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=49%2CUTAH.

- **Increased Development in Morgan County:** Morgan County has experienced dramatic population growth over the past 15 years. The population has grown from around 9,500 in 2010 to approximately 13,000 in 2024, a 36% increase. This population growth corresponds with a growth in development to accommodate new residents with goods, services, and homes. Because of this trend, which will likely continue in the short term, more people, structures, and infrastructure are exposed to severe snowstorms in Morgan County and the jurisdictions within it.
- **Adoption of Enhanced Building Codes:** As new buildings have been constructed in recent years they have adhered to higher building codes adopted by Morgan County and Morgan City. These codes make it less likely that buildings will collapse from the weight of snow during snowstorms. This is also true for other infrastructure, like electrical lines and road construction, which continues to improve over time.
- **Improved Technology:** As building materials and construction techniques continue to improve the risk of damage from snowstorms lowers. As older building get phased out with newer construction the remaining building stock in the county will be more prepared to withstand the pressures of severe snowstorms. This also is true for other infrastructure like roads, telecommunication infrastructure, and utility lines that will be periodically upgrades over the years.

Wildfire

Hazard Definition

A wildfire is an unplanned, unwanted fire burning in vegetated areas such as forests, shrublands, grasslands, or mixed wildland–urban interface (WUI) environments. Wildfire behavior is driven by fuel, weather, and topography—all of which vary significantly across Morgan County. The County contains both wildland areas (with little development) and extensive WUI zones (where homes and infrastructure intermingle with wildland fuels).

In Utah, approximately 65% of wildfires are lightning-caused, while 35% are human-caused, often by debris burning, equipment use, recreation, or vehicle-related ignitions. Wildfire impacts go beyond immediate flame contact. Fires remove vegetation, generate hydrophobic soils, increase erosion, degrade water quality, and elevate risks of post-fire flooding, debris flows, and landslides—all of which affect Morgan County's watersheds and steep canyon systems (see Figure 63).

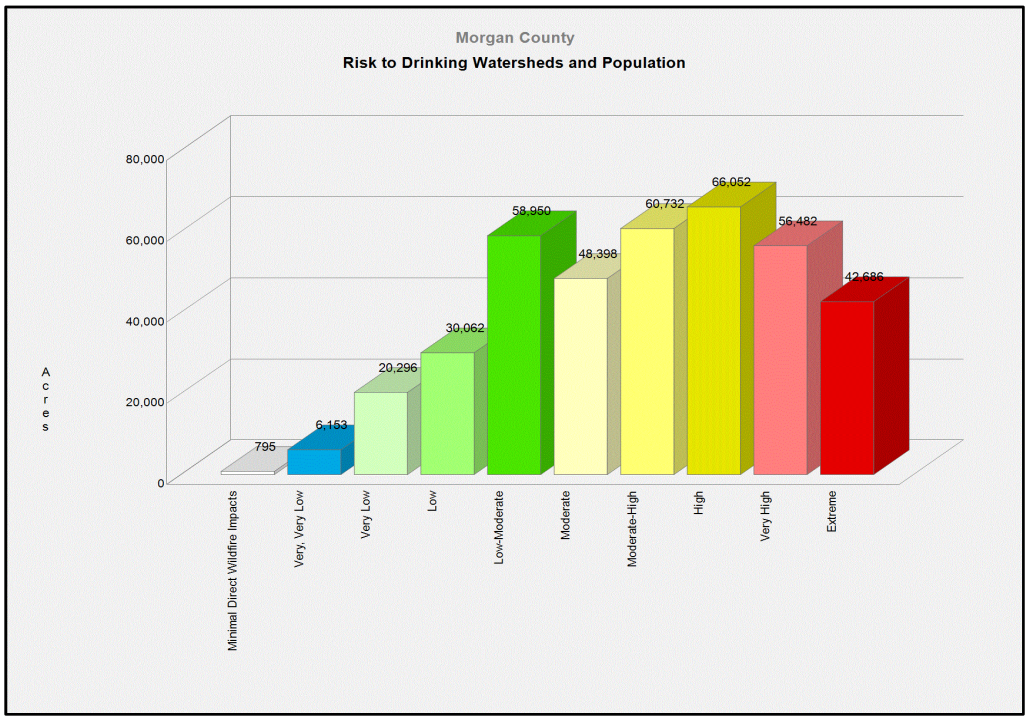


Figure 63: Drinking Water Watershed Risk and Population Exposure, Morgan County[143]

Due to increasing residential development in foothills and canyon areas—particularly near Mountain Green, Peterson, Milton, Richville, Littleton, and Porterville—Morgan County has significant exposure to direct wildfire impacts and secondary hazards that follow. The County relies on wildfire response

[143] Utah Division of Forestry, Fire & State Lands, "Utah Area of Interest Summary Report [computer application]," 2025, retrieved from https://wildfirerisk.utah.gov.

coordination through Morgan County Fire and Emergency Management Services (EMS), Utah Division of Forestry, Fire & State Lands (FFSL), and federal fire partners.

Table 42 illustrates the Wildfire Suppression Difficulty Index (SDI), which quantifies terrain, fuel, access, and expected fire behavior, and demonstrates that more than 80% of Morgan County falls into Moderate- to Very High–suppression difficulty.[144]

Table 42: Suppression Difficulty Index for Morgan County[145]

Suppression Difficulty Index Category		Acres	Percent
	Little to No Difficulty	13,211	3%
	Very Low Difficulty	6,303	2%
	Low Difficulty	25,232	6%
	Moderate Difficulty	94,779	24%
	High Difficulty	133,181	34%
	Very High Difficulty	116,712	30%
	Extreme Difficulty	1,189	0%
Total		**390,606**	**100%**

The following three conditions or factors affect fire behavior:

- **Topography:** Topography includes factors such as slope, aspect, and elevation. Fires spread faster upslope because fuels are closer to flames. Aspect also influences fuel moisture content. Fuels tend to be drier on south- and west-facing slopes. Higher elevations are related to cooler temperatures and higher relative humidity, as well as changes in vegetative fuel types
- **Vegetation:** The type of vegetation present has a major effect on how quickly a fire will spread. For example, light grasses burn rapidly, whereas heavy, dense fuels like Douglas Fir burn slowly but with greater intensity. Different fuels burn at different rates of spread and intensity, and resist control to different degrees.
- **Size, Continuity, and Compactness:** These factors also affect the fuel's rate of spread. Large fuels do not burn as readily as small fuels and take more heat to ignite. Small fuels ignite more easily, and fire will spread more rapidly through them. Continuity describes how a fuel is arranged horizontally. Fuels that are broken up in patches burn unevenly and more slowly than uniform fuels. Compactness is how fuel is arranged vertically. Compact fuels burn more slowly than tall, deep fuels that have more oxygen available.

[144] Utah Division of Forestry, Fire & State Lands, "Utah Area of Interest Summary Report [computer application]," 2025, retrieved from https://wildfirerisk.utah.gov.
[145] Utah Division of Forestry, Fire & State Lands, "Utah Area of Interest Summary Report [computer application]," 2025, retrieved from https://wildfirerisk.utah.gov.

- **Weather:** Weather (temperature, humidity, precipitation, and wind) affects the ease with which a fuel ignites, the intensity at which it burns, and how easy it may be to control. High temperatures heat fuels and reduce water content, which increases flammability. A decrease in relative humidity causes a proportionate decrease in fuel moisture, promoting easier ignition and more intense burning. Wind carries the heat from a fire into unburned fuels, drying them out and causing them to ignite more easily. Wind may also blow burning embers into unburned areas.

Geographic Location

Wildfire exposure in Morgan County is shaped by its steep topography, variable vegetation, and the concentration of new development along the east-facing Wasatch slopes and canyon mouths (see Figure 64). The western half of the County consists of heavily forested Wasatch Range foothills that create continuous, high-load fuel beds adjacent to residential communities. This zone—including Mountain Green, Peterson, Milton, Richville, and Porterville—represents the County's highest potential for fast-moving, high-intensity wildfires.

The Weber Canyon corridor contains dense conifer and mixed-vegetation fuels on steep slopes, with critical transportation and power infrastructure located immediately downslope. These north-facing slopes can support severe fire behavior when dry and may expose I-84, railroad facilities, and power transmission systems to elevated risk. The northeastern portion of Morgan County is characterized by drier grasslands and mixed shrublands, which generally support lower-intensity fires but are capable of rapid spread under red flag conditions. Infrastructure located in the WUI in these areas remains vulnerable, especially during periods of drought.

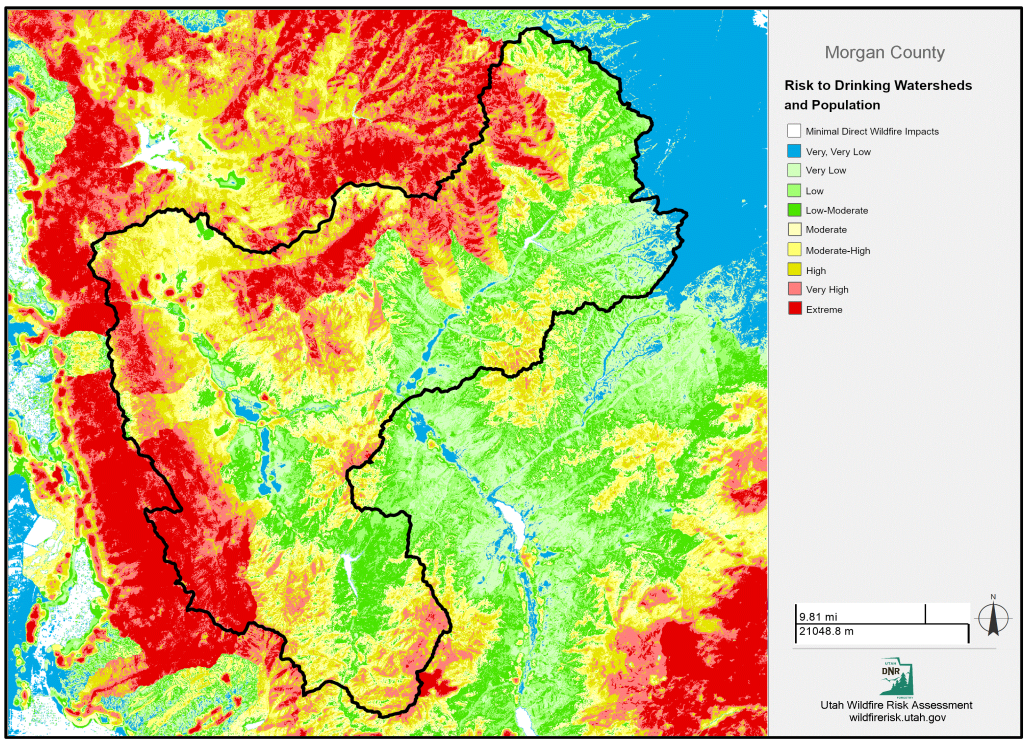


Figure 64: Spatial Distribution of Drinking Water Watershed Risk and Population Exposure, Morgan County[146]

In addition, the Wildfire Hazard Potential (WHP) dataset represents an index that quantifies the relative potential for wildfire that may be difficult to control. WHP can be used as a measure to help prioritize where fuel treatments may be needed. Figure 65 shows the distribution of low- to high-wildfire potential in Morgan County.

[146] Utah Division of Forestry, Fire & State Lands, "Utah Area of Interest Summary Report [computer application]," 2025, retrieved from https://wildfirerisk.utah.gov.

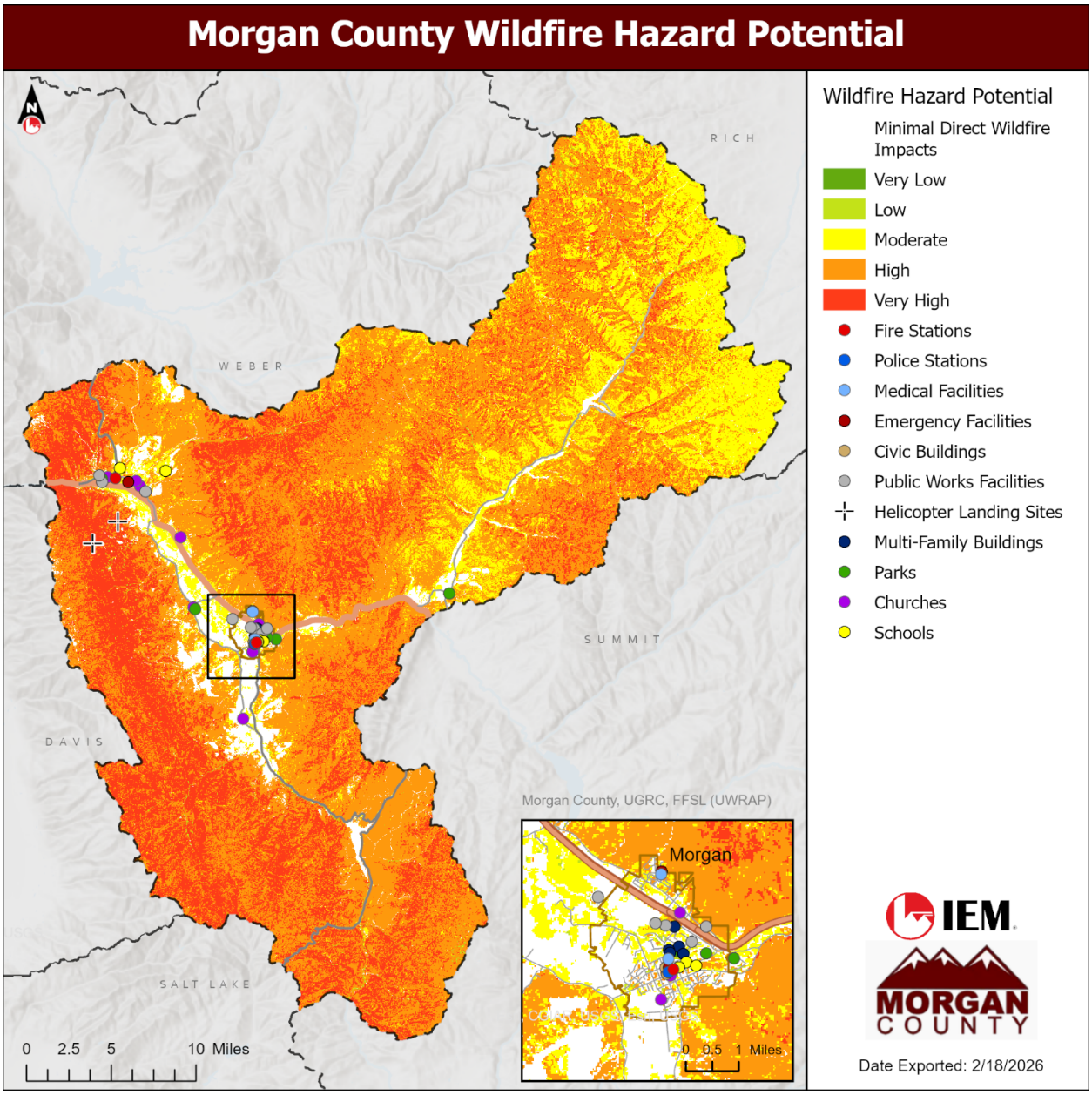


Figure 65: Wildfire Hazard Potential

Table 43 shows the wildfire hazard potential categories used to determine the scale of wildfire for Morgan County, including minimal direct wildfire impacts (Very Low, Low, Moderate, High, and Very High), the number of acres exposed, and the percentage of exposure based on level of impact.[147]

[147] Utah Division of Forestry, Fire & State Lands, "Utah Area of Interest Summary Report [computer application]," 2025, retrieved from https://wildfirerisk.utah.gov.

Table 43: Morgan County Wildfire Hazard Potential Dataset[148]

Wildfire Hazard Potential Category		Acres	Percent
	Minimal Direct Wildfire Impacts	19,893	5%
	Very Low	40	0%
	Low	2,153	1%
	Moderate	66,607	17%
	High	199,578	51%
	Very High	102,336	26%
Total		**390,607**	**100%**

WHP data indicate that over 75% of Morgan County is rated Moderate, High, or Very High for direct wildfire impacts, underscoring the broad geographic footprint of the hazard.

Magnitude and Severity

Morgan County uses the Utah Fire Danger Rating System (Low, Moderate, High, Very High, and Extreme) to characterize the severity of wildfire hazard:[149]

- **Low:** Grasses and brush do not ignite readily from small firebrands. Dead and down timber fires spread slowly on the ground with little danger of spotting.
- **Moderate:** Fires in open cured grasslands will burn briskly and spread rapidly on windy days. Timber fires spread slowly to moderately fast.
- **High:** Fires can easily start from most causes. Unattended brush and campfires are likely to escape, with fire spreading rapidly, and short-distance spotting is common.
- **Very High:** Fires start easily from all causes and, immediately after ignition, spread rapidly, and increase quickly in intensity. Spot fires starting new fires are a constant danger.
- **Extreme:** All fires are potentially serious because fires start quickly, spread furiously, and burn intensely. It is often too dangerous for firefighters to engage in direct attack suppression tactics.

The most damaging fires in the County occur under High, Very High, or Extreme conditions, when wind, low humidity, and dry fuels align. Under these conditions, even small ignitions can grow rapidly, generate long-range spotting, and challenge initial attack resources.

[148] Utah Division of Forestry, Fire & State Lands, "Utah Area of Interest Summary Report [computer application]," 2025, retrieved from https://wildfirerisk.utah.gov.
[149] Utah Department of Natural Resources, "Fire Danger," 2025, https://utah-fire-info-utahdnr.hub.arcgis.com/pages/fire-danger.

Fires in Morgan County range from grass and brush fires (rapid spread, low-to-moderate intensity) to high-intensity crown fires in densely forested Wasatch slopes. Large wildfires can threaten homes and critical facilities, damage power and transportation corridors, and initiate hazardous post-fire flooding and debris flows—particularly in steep canyons above Mountain Green, Peterson, Morgan City, and Milton.

The County's wildfire danger is amplified by the following:

- **High suppression difficulty** across most terrain (Table 42 shows 64% of County acreage rated High to Very High SDI)
- **Steep slopes**, which accelerate fire spread upslope
- **Dense forest and mixed shrub fuels** with high potential for crown fire
- **Limited evacuation routes** in some foothill subdivisions
- **Wind events**, including canyon downslope winds that can rapidly shift fire direction

The Utah Department of Air Quality provides daily air quality forecasts for various reporting areas across the state. The Ogden reporting area is designed to report air quality for Morgan County. Primary pollutants are measured as particulate matter (PM), a complex mixture of solid and liquid particles that vary in size and composition and remain suspended in the air.[150]

Overall severity is best described as Moderate to Severe at the County scale, with potential for Extreme severity during periods of extreme drought, low snowpack, or prolonged heat.

Historical Occurrences

Morgan County did not receive a wildfire-related Federal Emergency Management Agency or State disaster declaration or Fire Management Assistance Grant between 2000 and 2025. However, multiple wildfires have occurred in and around the County that highlight exposure to both direct flame threat and post-fire runoff hazards.

The National Oceanic and Atmospheric Administration/National Centers for Environmental Information records list one directly recorded wildfire event for Morgan County between 2000 and 2025, though additional local and state sources document other significant fires. Underreporting is common for smaller fires extinguished during initial attack.

- **Rockport Fire – August 18, 2013:** This lightning-caused fire near Wanship/Rockport State Park (adjacent to Morgan County) burned 1,920 acres, destroyed eight homes and 20 outbuildings, and damaged culverts and power infrastructure. Estimated residential losses totaled $550,000.

[150] United States Environmental Protection Agency, "Guidelines for Developing an Air Quality (Ozone and PM 2.5) Forecasting Program," 2003, https://www.airnow.gov/publications/weathercasters/guidelines-developing-air-quality-forecasting-program/.

- **East Canyon Fire – June 8, 2021:** This fire burned 832 acres on Utah Department of Wildlife Resources lands near East Canyon Reservoir south of Morgan City. It demonstrated high spread potential in mixed grass and timber fuels near canyon recreation areas.
- **2025 Statewide Emergency – Executive Order 2025-08:** Extreme drought, record-low snowpack, and early melt led to widespread fire activity statewide, with Utah recording 693 fires and nearly 114,000 acres burned by July 31, 2025. Morgan County was subject to statewide Red Flag Warnings (22 days year to date through July 31, 2025) and participated in regional resource mobilization due to elevated local fire danger.

Although Morgan County has not experienced a large-scale catastrophic wildfire in recent decades, proximity to large fires in neighboring Wasatch and Summit Counties demonstrates that regional fire behavior and suppression resource availability strongly affect local risk.

Historic fire perimeters provided by Utah FFSL and shown in Figure 66 indicate areas where wildfires since 1999 have burned at least 10 acres.

STATE AND FEDERAL DISASTER DECLARATIONS

A review of the FEMA Disaster Declarations Database indicates that Morgan County has not received any federal major disaster declarations or Fire Management Assistance Grants (FMAG) specifically related to wildfire since the previous Morgan County Hazard Mitigation Plan update. Similarly, the State of Utah has not issued a state disaster declaration specifically for wildfire impacts affecting Morgan County during this period. However, wildfire activity across Utah has periodically resulted in statewide emergency actions. For example, Utah Executive Order 2025-08 declared a statewide emergency related to extreme wildfire conditions, including drought, low snowpack, and elevated fire danger across multiple counties. Although Morgan County was included in statewide fire-weather warnings and preparedness actions associated with this declaration, no county-specific disaster declaration was issued.

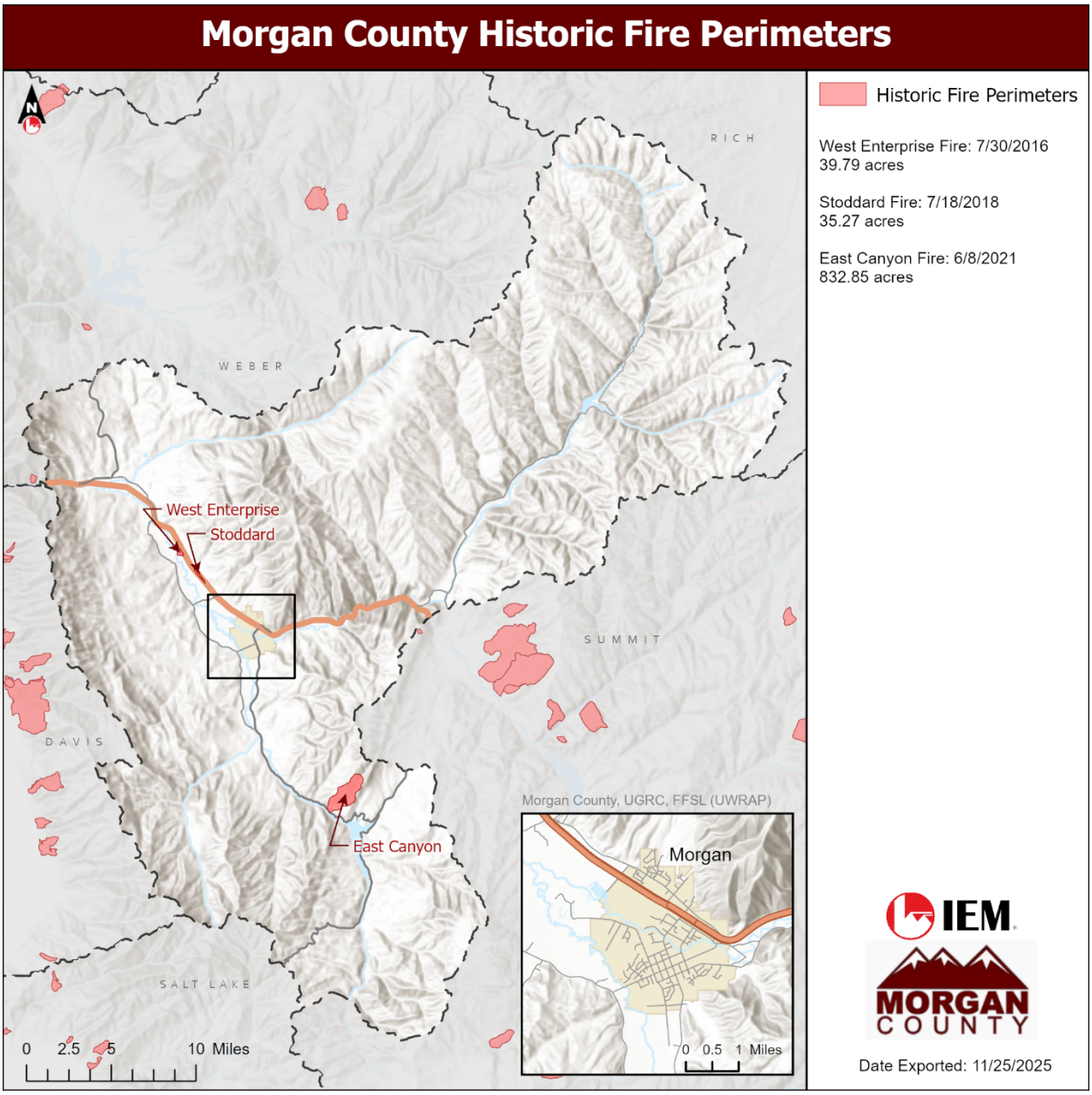


Figure 66: Historic Fire Perimeters, Morgan County

Probability and Effects of Future Conditions

Based on historical wildfire activity, burn-probability modeling, and the widespread presence of wildland fuels across Morgan County, the probability of wildfire affecting the County within the next five years is considered Highly Likely. Wildfire ignitions occur in or near Morgan County every year, although most fires are contained during initial attack and remain small. However, under periods of drought, low snowpack, high temperatures, and strong wind conditions, individual fires have the potential to grow rapidly and threaten communities in the wildland–urban interface.

Wildfire probability is expected to increase due to the following:

- **Warming Temperatures:** Utah has already warmed more than 2.5°F since the early 20th century[151], and projections from the Utah Climate Center and the Fifth National Climate Assessment indicate continued warming across all seasons[152]. Higher temperatures increase evapotranspiration, dry vegetation earlier in the year, and extend the number of "critical fire weather days" with very low fuel moisture. Warmer nights also limit overnight fuel recovery, allowing fires to burn more intensely and spread more quickly.
- **Decreasing Snowpack and Earlier Snowmelt:** Snowpack accumulation in northern Utah has become more variable, and spring melt is occurring several weeks earlier than historical averages. Earlier melt exposes soils and vegetation sooner, lengthens the shoulder season (March–June), and reduces water availability later in summer—collectively creating longer windows for high-intensity fire behavior. Low snowpack years (e.g., 2025, with snow water equivalents falling below 50% of normal) are strongly correlated with above-average fire activity.
- **Increased Drought Frequency and Severity:** More frequent and prolonged droughts stress vegetation and increase both live fuel moisture loss and accumulation of dead fuels, which burn hotter and faster. Extended drought also impairs forest resilience, making trees more susceptible to pests and diseases and increasing the chance that even small ignitions will exhibit extreme fire behavior under hot, windy conditions.
- **Greater Wind Exposure:** Morgan County regularly experiences strong wind events, including downslope and canyon winds that significantly accelerate fire spread. High winds increase flame lengths, drive rapid upslope fire runs, transport burning embers long distances (spotting), and complicate suppression efforts. Wind-driven fire behavior—especially in Weber Canyon and foothill areas—represents one of the most dangerous wildfire scenarios for the County.
- **Invasive Species and Forest Stress:** Hotter and drier conditions have promoted the spread of invasive grasses (especially cheatgrass), which cure earlier in the season and create highly flammable, continuous fine fuels that enable fast-moving fires. Likewise, warming temperatures allow bark beetles and other forest pests to survive through winter and expand into higher elevations. Beetle-killed forests add large amounts of dead fuel, increasing the likelihood of high-intensity, fast-spreading fires and reducing the capacity of forests to naturally recover.
- **Continued Development in the WUI:** Ongoing growth in foothill and canyon communities increases ignition potential and places more structures, businesses, and infrastructure in the WUI. More homes near flammable vegetation raise the likelihood that human-caused ignitions will occur, and increase the total damage from any given wildfire. Development patterns that expand into steep, vegetated slopes or areas with limited evacuation access amplify future risk.
- **Post-Fire Flooding and Debris Flows:** As wildfire activity increases, so does the probability of severe post-fire flooding, debris flows, and sediment transport, particularly in steep drainages such as East

[151] Natural History Museum of Utah, "Understanding Climate Change in Utah," 2026, https://nhmu.utah.edu/climate-of-hope/climate-change-utah.
[152] U.S. Global Change Research Program, "Fifth National Climate Assessment: Chapter 2 Future Trends," 2023, https://toolkit.climate.gov/sites/default/files/2025-07/NCA5_Ch2_Climate-Trends.pdf.

Canyon, Hardscrabble, Dry Hollow, and Lost Canyon. Burned soils can become hydrophobic, reducing infiltration and dramatically increasing runoff rates during even moderate storms. Post-fire events often cause more harm to infrastructure than the fire itself, affecting roads, culverts, water quality, and downstream communities.

- **Hotter, Drier Conditions Increasing Fire Intensity and Altering:** Rising temperatures and more frequent drought have already increased the intensity and destructiveness of wildfires across the western United States, including in Utah. While fire is a natural ecological process and forest management policies increasingly emphasize the value of restoring natural fire cycles, these benefits are complicated by climate-driven changes in fuel conditions. Hotter, drier weather accelerates drying of brush, grasses, and forest fuels, making landscapes more prone to ignition and rapid spread. Warmer winters also enable bark beetle outbreaks, which have killed thousands of square miles of trees across the interior West; these dead trees significantly increase fuel loads and contribute to faster-moving, higher-intensity fires under modern climate conditions.

Figure 67 shows the annual wildfire burn probability (in acres) for Morgan County.[153] Figure 68 shows the geographic distribution of burn probability.

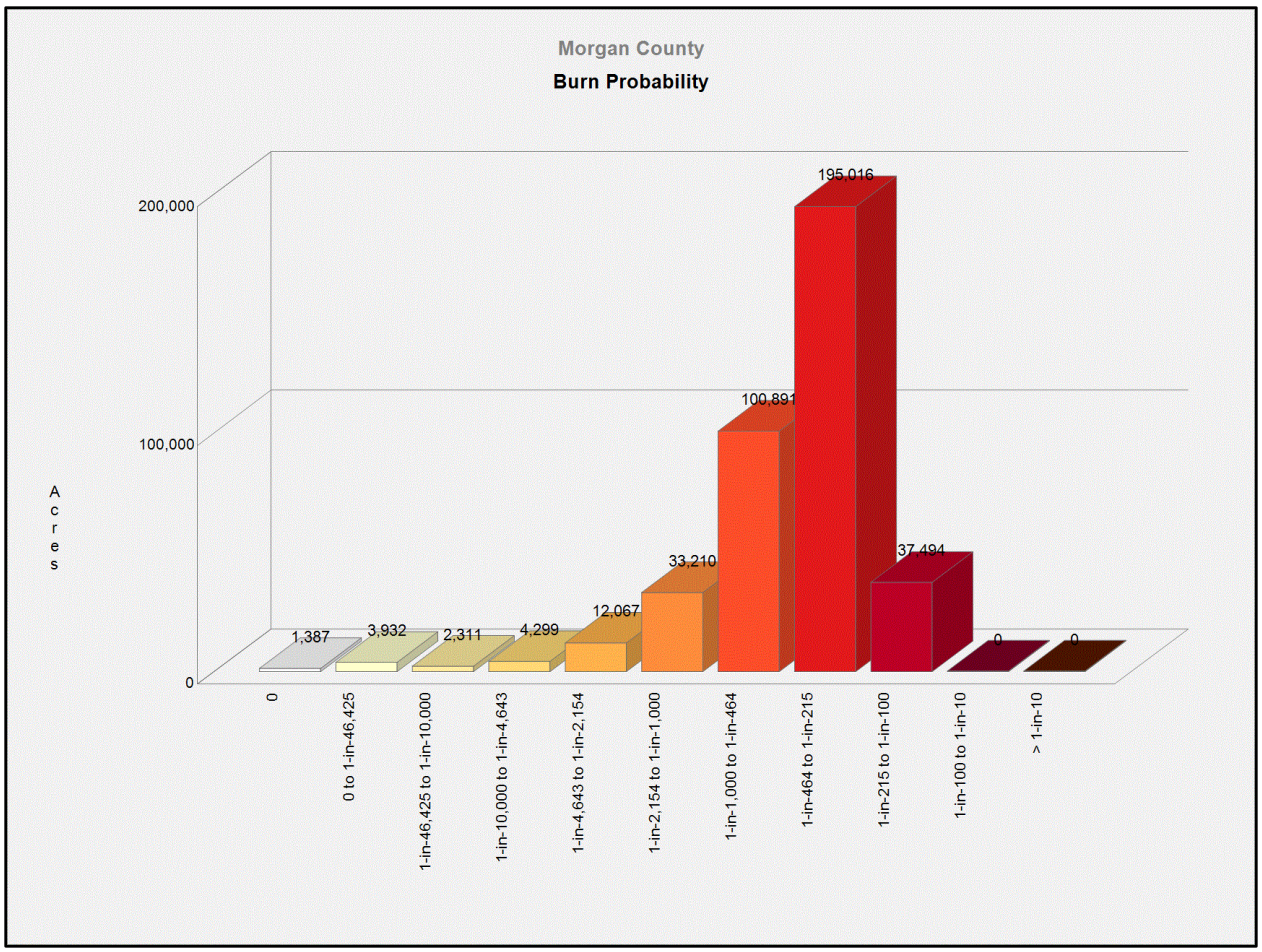


Figure 67: Burn Probability in Acres, Morgan County [154]

[153] Utah Division of Forestry, Fire & State Lands, "Utah Area of Interest Summary Report [computer application]," 2025, retrieved from https://wildfirerisk.utah.gov.
[154] Utah Division of Forestry, Fire & State Lands, "Utah Area of Interest Summary Report [computer application]," 2025, retrieved from https://wildfirerisk.utah.gov.

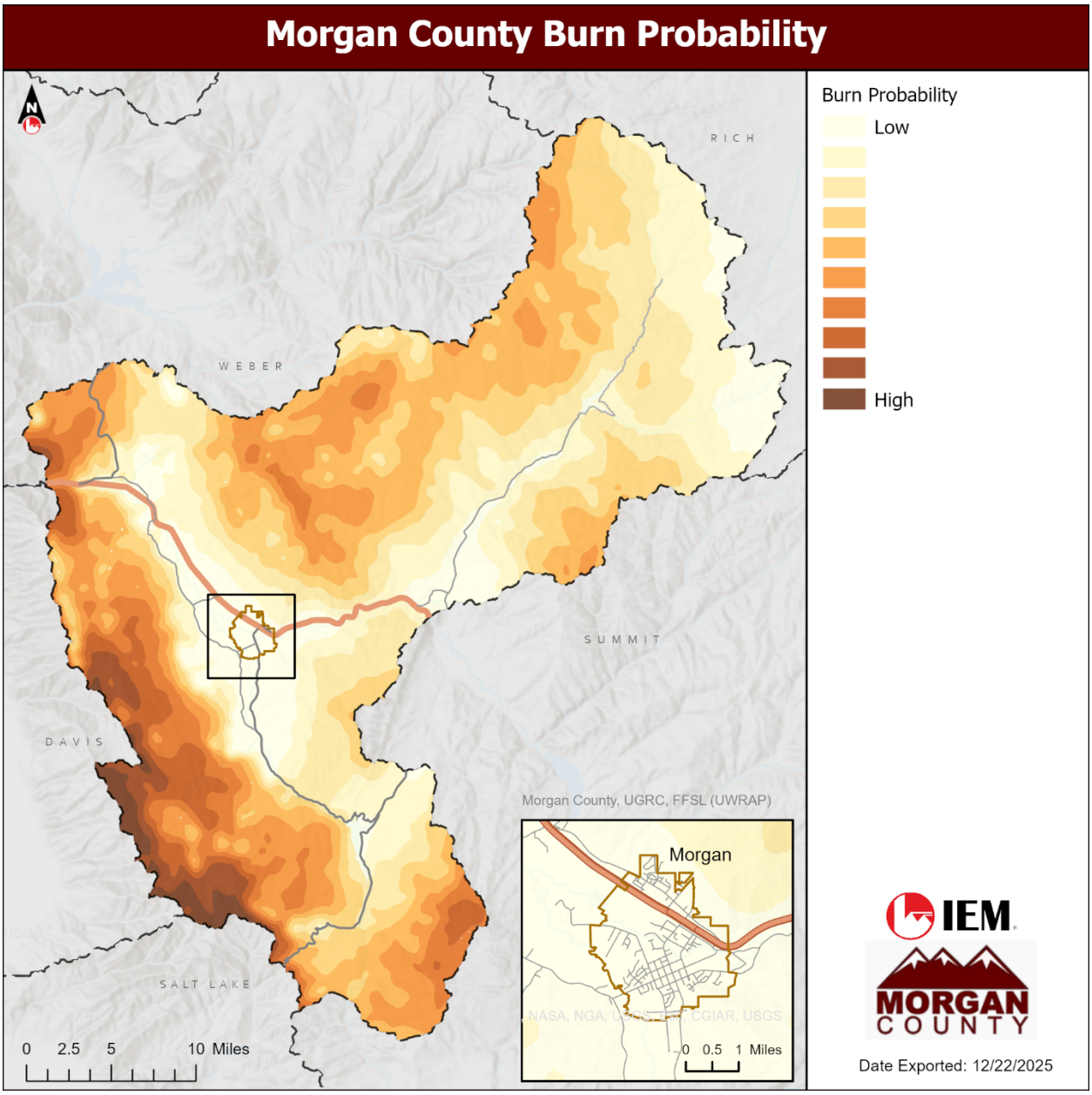


Figure 68: Burn Probability, Morgan County

Figure 69 shows that the wildfire risk level for Morgan County is **very high**, with a likelihood greater than 91% nationally. Wildfire likelihood is the probability of wildfire burning in any given year.[155]

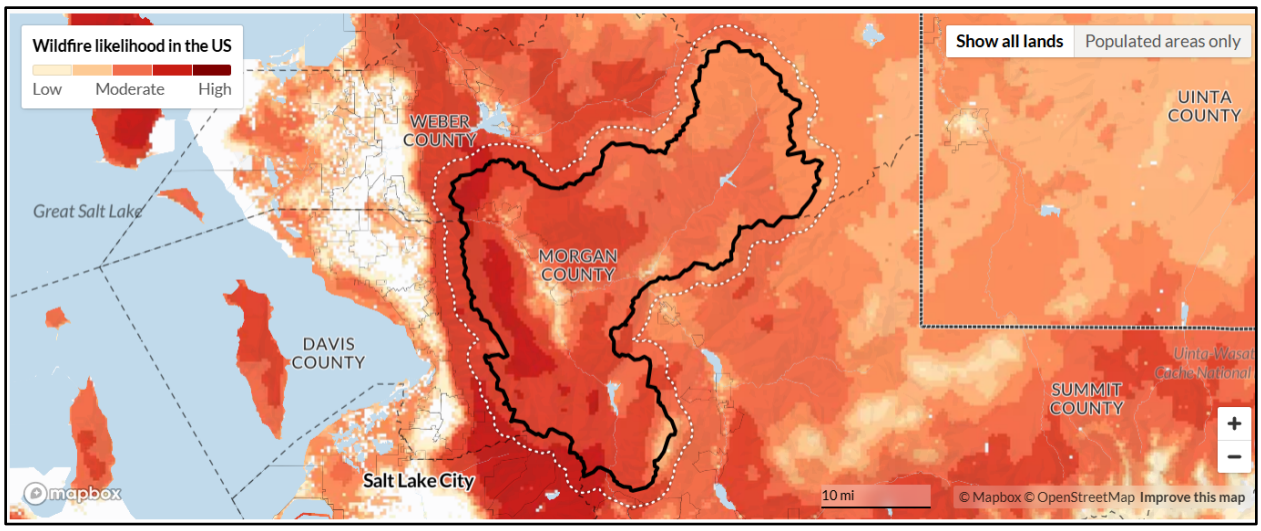


Figure 69: Wildfire Likelihood, Morgan County[156]

[155] U.S. Department of Agriculture, U.S. Forest Service, Wildfire Risk.org, "Wildfire Likelihood for Morgan County," 2025, https://apps.wildfirerisk.org/explore/overview/49/49029/.
[156] U.S. Department of Agriculture, U.S. Forest Service, Wildfire Risk.org, "Wildfire Likelihood for Morgan County," 2025, https://apps.wildfirerisk.org/explore/overview/49/49029/.

Figure 70 shows the probability of extreme fire behavior, based on models of probability of flame-length probabilities exceeding 11 feet. High probability of extreme fire behavior is prominent in the higher elevations of Morgan County.

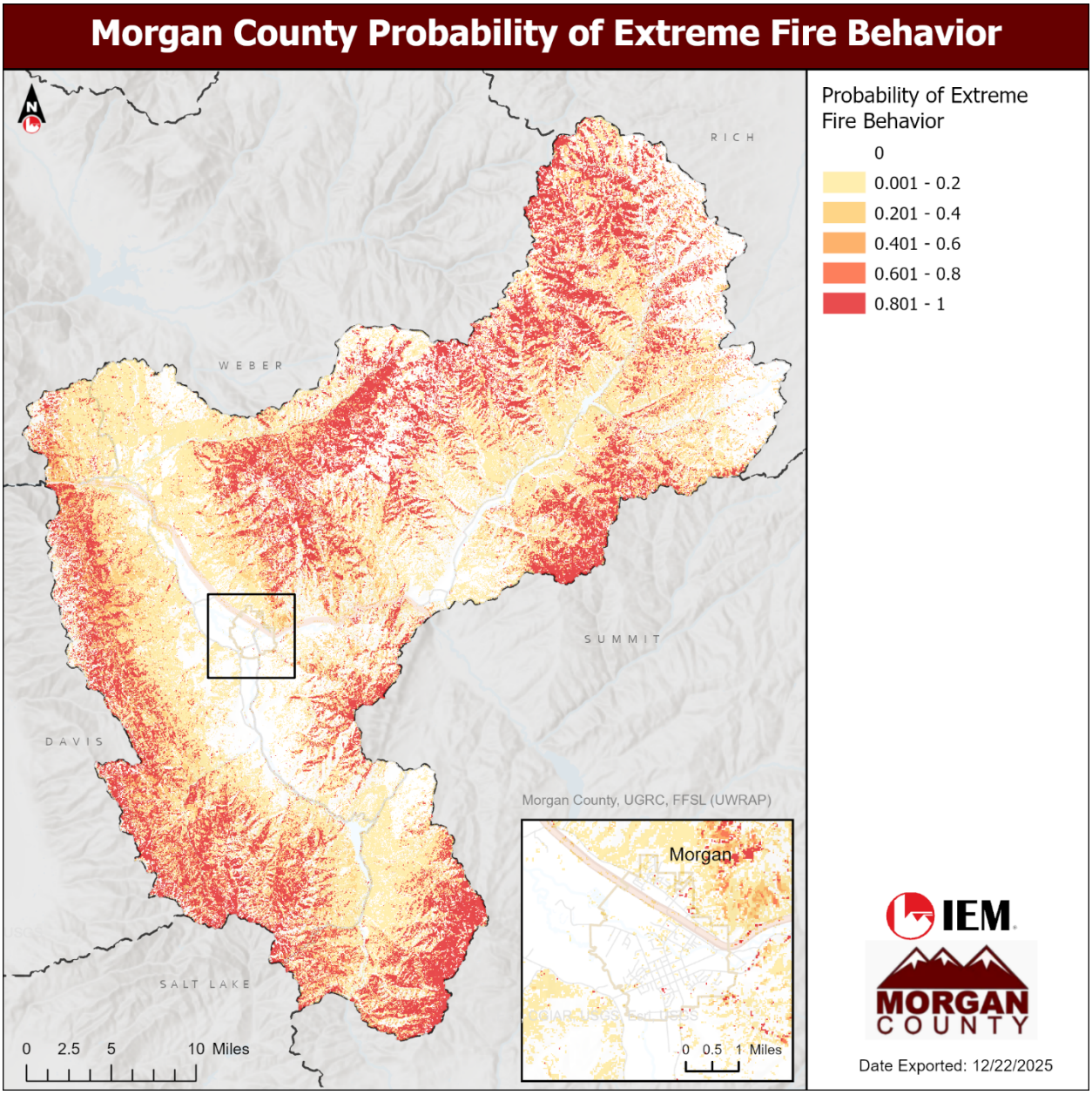


Figure 70: Probability of Extreme Fire Behavior, Morgan County

Figure 71 shows Risk Reduction Zones, where mitigation activities (fuel treatments, home hardening, and defensible space) will be most effective. Morgan County's structures are predominantly in the Direct Exposure Zone, meaning wildfire can directly contact buildings without intervening fuels being modified.

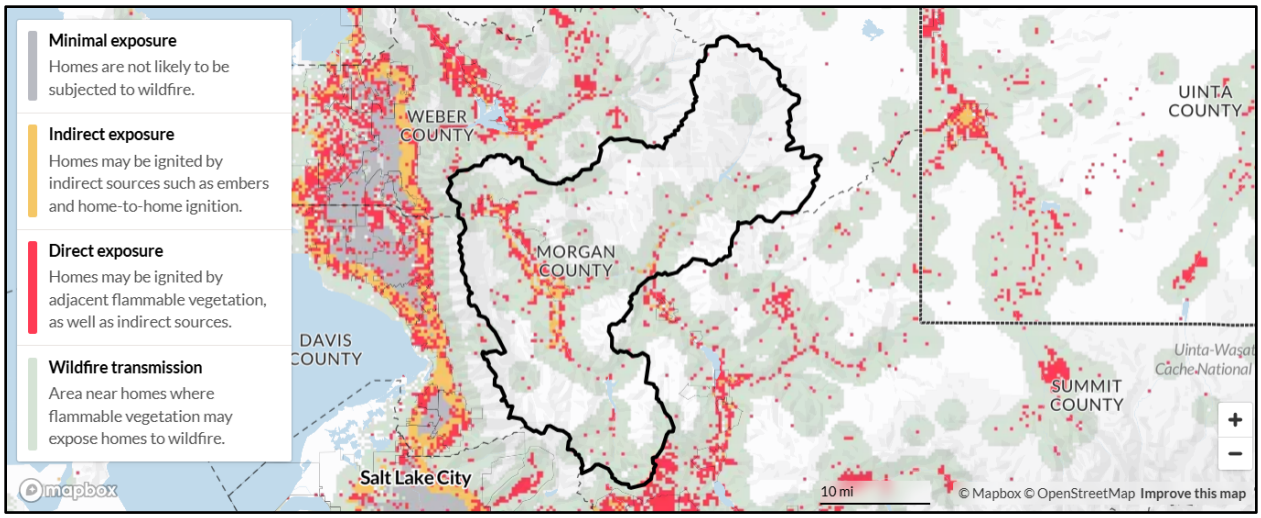


Figure 71: Risk Reduction Zones, Morgan County[157]

Utah FFSL released updates to the Wildfire Risk Assessment Portal in December 2025. This included the Smoothed Structure Exposure Score map, which considers both wildfire likelihood and consequence of wildfire to homes. This score is then used to identify areas with an exposure score of 7 or greater and a minimum of two structures located within a 250-meter radius to generate the High-Risk WUI dataset. This dataset is created specifically to identify and prioritize structures most susceptible to wildfire impacts, guide critical risk assessment, and facilitate compliance with Utah law.[158] Figure 72 shows the structure exposure scores and the high-risk WUI properties in Morgan County.

[157] U.S. Department of Agriculture, U.S. Forest Service, Wildfire Risk.org, "Risk Reduction Zones for Morgan County," 2025, https://apps.wildfirerisk.org/explore/overview/49/49029/.
[158] Utah Division of Forestry, Fire & State Lands, "Utah Wildfire Risk Assessment and High Risk WUI, UWRAP 2025," https://storymaps.arcgis.com/stories/e4e4d803d9f1437c97883ce1b93abc1b.

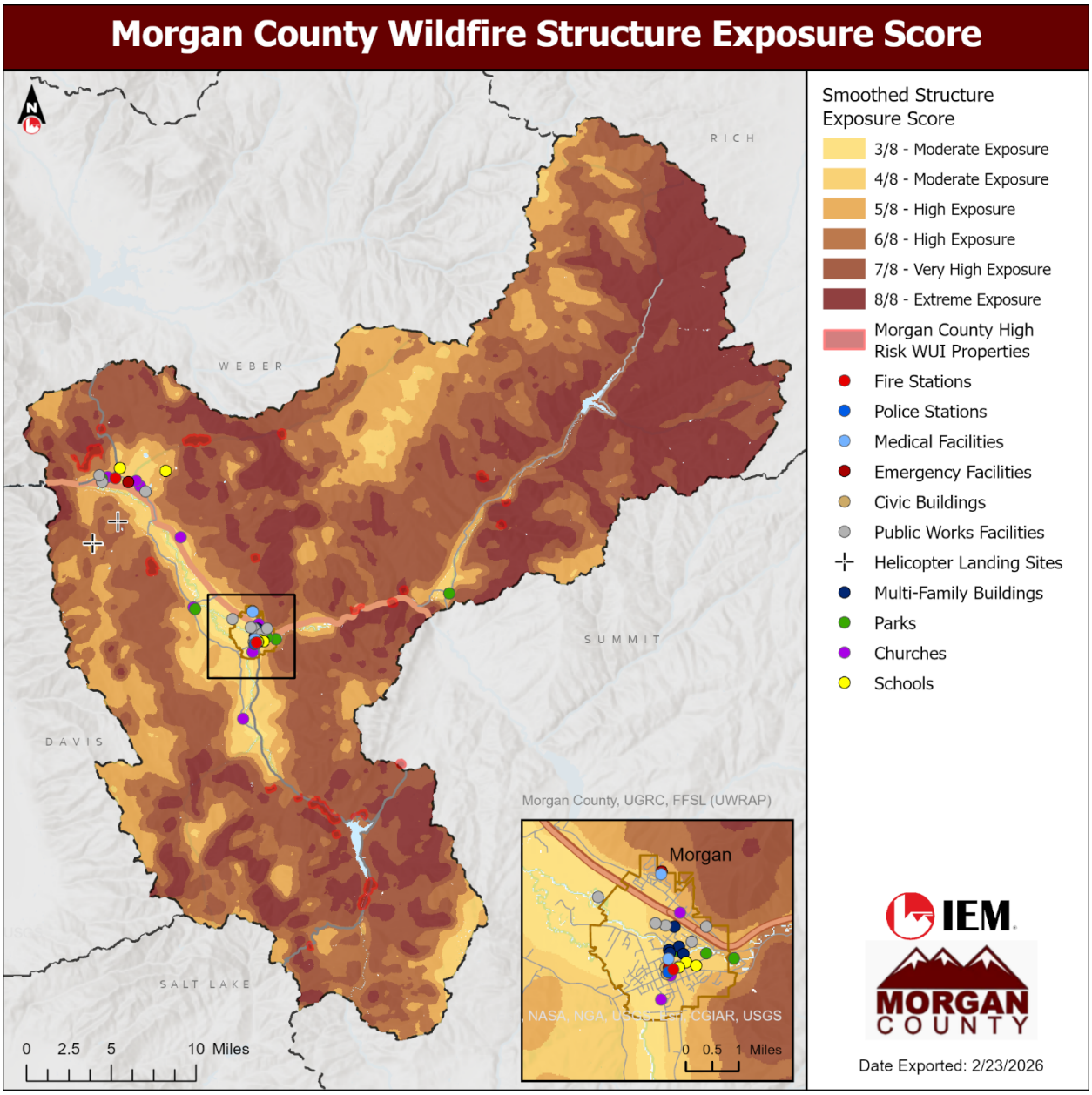


Figure 72: Wildfire Structure Exposure and High-Risk Wildland–Urban Interface, Morgan County

Overall, Morgan County's probability of future wildfire impacts is assessed as High, with increasing severity in years dominated by drought, early melt, and wind-driven fire conditions.

Mitigation Strategy

Introduction

The mitigation strategy establishes the framework through which the plan participants identify, prioritize, and implement actions to reduce long-term risk from natural and human-caused hazards. This strategy translates the findings of the Risk Assessment and Capability Assessment into a coordinated set of mitigation actions that are realistic, actionable, and aligned with local priorities, available resources, and Federal Emergency Management Agency (FEMA) requirements.

The 2026 mitigation strategy builds upon the foundation established in the 2021 Morgan County Pre-Disaster Mitigation Plan. It reflects both carried-forward actions that remain relevant and effective and new mitigation actions developed in response to emerging risks, updated data, and changes in development patterns, infrastructure, and community needs.

Consistent with FEMA's *Local Mitigation Planning Handbook*, the mitigation strategy emphasizes the following:

- Risk-informed decision-making, grounded in hazard probability, exposure, and vulnerability
- Avoidance of future risk, particularly through land-use planning, development standards, and protection of natural mitigation features
- Protection of life safety, critical facilities, and essential services
- Integration of mitigation into other plans and programs, including capital improvement planning, land-use policies, emergency operations, and sector-specific plans

Mitigation actions are designed to address the full range of hazards identified in this plan. Each action identifies the hazard addressed, the vulnerability reduced, responsible agencies, potential funding sources, implementation time frames, and priority, providing a clear roadmap for implementation and monitoring over the five-year planning horizon.

Vision, Goals, and Objectives

Vision

The vision for hazard mitigation in Morgan County, as established in the 2021 Morgan County Pre-Disaster Mitigation Plan, is carried forward unchanged into this update:

> *Morgan County and its participating jurisdictions will proactively reduce the risk to life, property, infrastructure, and natural resources from natural and human-caused hazards through informed*

planning, sound policy, strategic investment, and coordinated action, while preserving the community's rural character, economic vitality, and quality of life.

This vision continues to reflect the community's long-term commitment to resilience, recognizing that hazard mitigation is an ongoing process that must adapt to changing conditions.

Goals

The mitigation goals established in the 2021 plan are retained in this update, as they remain relevant and consistent with current hazard conditions, community values, and FEMA mitigation planning guidance. These goals provide continuity between planning cycles and ensure that previously identified priorities continue to guide mitigation investment and decision-making.

Short-Term Goals

1. Protect human life before, during, and after the occurrence of a natural hazard;
2. Prevent loss of life and reduce the impact of damage where they cannot be eliminated;
3. Protect emergency response capabilities;
4. Improve communication and warning systems;
5. Improve emergency medical services and facilities;
6. Improve mobile resources;
7. Protect critical facilities and infrastructure;
8. Maintain government continuity during natural hazards;
9. Protect homes, businesses, property, industry, and educational facilities by combining hazard loss reduction with the community's social, economic, and environmental needs;
10. Protect natural resources and the environment when determining mitigation measures;
11. Promote public awareness through education of community hazards and mitigation measures; and
12. Preserve and/or restore natural features that provide mitigation, such as floodplains, riparian areas, and other open spaces.

Long-Term Goals

1. Eliminate or reduce the long-term risk to current and future human life and property from identified natural and technologic hazards;
2. Aid in both the private and public sectors in understanding the risks they may be exposed to and finding mitigation strategies to reduce those risks;
3. Avoid risk of exposure to identified hazards;
4. Minimization of the impacts of damage as a result of identified hazards;

5. Accomplish mitigation strategies in such a way that negative environmental impacts are minimized;
6. Provide a basis for funding of projects outlined as hazard mitigation strategies;
7. Establish a regional platform to enable the community to take advantage of shared goals, resources, and the availability of outside resources; and
8. Establish a framework and database for the county seat to use to apply for aid.

Mitigation Action Prioritization

Morgan County and its participating jurisdictions prioritized mitigation actions using a structured methodology that meets the requirements of 44 CFR §201.6(c)(3)(ii) and follows FEMA guidance in the *Local Mitigation Planning Handbook*. The purpose of this process is to ensure that mitigation actions selected for implementation over the five-year planning period are effective, feasible, and aligned with the County's highest risks and available capabilities.

The prioritization process draws directly from the plan's Risk Assessment, Capability Assessment, and the mitigation goals and objectives carried forward from the 2021 Morgan County Pre-Disaster Mitigation Plan. Both previously adopted actions and newly identified actions were evaluated using the same criteria to ensure consistency across planning cycles.

Each mitigation action was first reviewed to confirm that it addresses one or more of the hazards identified in the Risk Assessment and reduces documented vulnerabilities to people, structures, infrastructure, or essential services. Actions addressing hazards with high probability, high potential consequences, or recurring impacts within Morgan County were given increased priority consideration.

Actions were then evaluated for feasibility using information from the Capability Assessment, including administrative authority, technical capacity, staffing, and experience with similar projects. Financial feasibility was also considered, including the availability of local funding and the action's eligibility for state and federal mitigation programs. Actions that could be implemented through existing programs, phased over time, or integrated into capital improvement planning were prioritized.

The County and participating jurisdictions also considered implementation readiness and timing. Actions that are immediately achievable or that establish the foundation for future mitigation projects—such as planning, ordinance updates, and asset inventories—were prioritized alongside capital projects that address critical vulnerabilities.

Finally, preference was given to mitigation actions that address multiple hazards or provide additional benefits, such as protecting natural systems, improving public health, or reducing long-term maintenance and recovery costs.

Based on this evaluation, each mitigation action was assigned a relative priority level to guide implementation and funding decisions during the planning period. These priorities are intended to support decision-making and may be adjusted over time as conditions change, projects advance, or new

funding opportunities arise. Priorities will be reviewed as part of the plan's annual monitoring and update process.

Mitigation actions were prioritized based on the following considerations:

- Degree to which the action reduces risk to life, property, and critical facilities
- Severity and likelihood of the hazard addressed
- Consistency with mitigation goals and objectives
- Technical, administrative, and legal feasibility
- Availability of funding and grant eligibility
- Implementation readiness and time frame
- Ability to address multiple hazards or provide co-benefits

Priority levels are defined as follows:

- **High Priority:** Actions that significantly reduce risk to life safety or critical facilities and are feasible within current capabilities
- **Medium Priority:** Actions that reduce risk but require additional coordination, planning, or funding
- **Low Priority:** Actions with longer-term benefits or higher resource requirements relative to current capacity

Hazard Mitigation Actions

A comprehensive array of mitigation actions were considered as part of this plan update. In accordance with FEMA guidelines and best practices, hazard mitigation actions are linked to vulnerabilities and capabilities, emphasizing risk reduction to existing structures, limiting risk to new development, and considering vulnerable populations. Community lifelines were also considered as part of the plan. Types of actions in this plan update include the following:

- **Local Plans and Regulations:** These actions include governmental laws, regulations, policies, or codes that influence building and development.
- **Structure and Infrastructure Projects:** These actions involve modifying existing structures and infrastructure to reduce risk from hazards or remove them from hazardous areas entirely. This applies to public or private structures, as well as critical facilities and infrastructure.
- **Natural Systems Protection:** This type of action can include green infrastructure and low-impact development, nature-based solutions, engineering with nature, and bioengineering to incorporate natural features or processes into the built environment.
- **Education and Awareness Programs:** These actions keep residents informed about potential hazards in their communities.

Each of the prior plan's actions was reviewed, and plan participants provided status updates. Ongoing actions were reviewed to determine whether they should be retained in the current plan or whether they were no longer relevant. Non-mitigation actions, such as response activities, were allowed, but participants were encouraged to focus on hazard mitigation activities with the understanding that these non-mitigation activities would not be reviewed during the state and federal plan review process.

New mitigation actions were derived through input from plan participants, advising consultants, stakeholders, and the public. Plan participants worked throughout the planning process to identify areas of vulnerability and developed mitigation actions to address them. Stakeholder and public feedback, along with specific mitigation action suggestions, were also reviewed at the planning meetings. Plan participants were encouraged to select these actions or a variant thereof as appropriate.

The mitigation actions chosen for inclusion in the Hazard Mitigation Plan (HMP) are located in the specific plan participant annex to which they apply. Each plan participant developed a mitigation action plan for their annex that includes a description of the actions they selected and key information such as lead agency, timeline, and funding source. Table 44 lists and describes the components of the mitigation action plans included in each annex.

Table 44: Mitigation Action Plan Components

Topic	Description
#	Mitigation action number for the individual plan participant
Action Title	Title briefly describing the intent of the mitigation action
Description	A longer description of the action highlighting project activities and benefits
Hazard Addressed	List of all hazards addressed: Avalanche, Dam Failure, Drought, Earthquake/Seismic Hazards, Erosion, Extreme Cold, Flood, Hail, High Wind, Landslides, Problem Soils, Radon, Snowstorms, and Wildfire
Vulnerability	A short description of how the jurisdiction is particularly vulnerable to the hazard being addressed
Goals	Mitigation goals with which the action aligns
Lead Agency	Lead agency, department, or position responsible for implementing or managing the mitigation action
Funding Source	Possible funding source(s) for the mitigation action
Timeline	An estimate of the timeframe the action will take to be completed
Priority	Action priority was subjectively defined by the plan participant after considering the benefits when compared to costs of the projects. Action priorities are defined as low, medium, or high based on the following criteria: • **High Priority:** Actions that significantly reduce risk to life safety or critical facilities and are feasible within current capabilities.

Topic	Description
	• **Medium Priority:** Actions that reduce risk but require additional coordination, planning, or funding. • **Low Priority:** Actions with longer-term benefits or higher resource requirements relative to current capacity.

Considered Mitigation Actions

A wide array of potential mitigation actions were considered by plan participants for each of the hazards profiled in this plan. These considered mitigation actions came from plan participants, stakeholders, the public, FEMA reports, and the consultant advising the HMP update. Table 45 outlines some of the considered mitigation actions for this HMP update.

Table 45: Considered Mitigation Actions

Hazard	Mitigation Action	Type of Action
Avalanche	Build direct protection structures to protect buildings and infrastructure from damage from avalanches.	Structure and Infrastructure Projects
Dam Failure	Host a yearly educational workshop on the risks of dam failure in Morgan County.	Education and Awareness Programs
Drought	Develop landscaping and natural design measures for government-owned properties to reduce water usage.	Natural Systems Protection
Earthquake/Seismic Hazards	Adopt and enforce an enhanced seismic building code.	Local Planning and Regulations
Erosion	Develop and maintain a database to track community vulnerability to erosion.	Local Planning and Regulations
Extreme Cold	Develop an educational program for residents on the dangers of extreme cold temperatures and support systems available through Morgan County.	Education and Awareness Programs
Flood	Remove or elevate structures located in the floodplain or subject to repetitive flooding.	Structure and Infrastructure Projects
Hail	Integrate hail-protective measures on government-owned vehicles and buildings.	Structure and Infrastructure Projects
High Wind	Strengthen power lines and infrastructure against damage from high winds.	Structure and Infrastructure Projects

Hazard	Mitigation Action	Type of Action
Landslides	Create and implement setback limits on parcels near high-risk landslide areas.	Local Planning and Regulations
Problem Soils	Monitor areas with problem soils for expansion or subsidence, especially during extreme changes in precipitation.	Local Planning and Regulations
Radon	Provide educational materials for homeowners on how to detect and mitigate radon in the home.	Education and Awareness Programs
Snowstorms	Install snow fences to limit blowing and drifting snow over critical roadway segments.	Structure and Infrastructure Projects
Wildfire	Develop a vegetation management plan to improve defensible space for government and private structures.	Natural Systems Protection

Plan Maintenance and Implementation

A formal plan maintenance process for monitoring, evaluating, and updating the HMP must take place to ensure that the plan, and specifically the mitigation strategy, remain current and relevant. Updates are required every five years from the date the plan is approved. Regularly scheduled evaluations during the five-year cycle are important to assess the effectiveness of the program and to reflect changes that may affect mitigation priorities, and a process must be undertaken to keep the public engaged throughout the plan's ongoing implementation.

Morgan County Emergency Management will continue to take the lead role in coordinating the overall plan maintenance effort, with ongoing support and feedback from Morgan City and Morgan County School District administration. Each planning team member will take the lead role in plan monitoring and evaluation activities for their respective jurisdiction. Details on this process are included in this section, as well as how the plan will be integrated into other planning mechanisms.

Implementation

Strategies developed by participating jurisdictions may be implemented at the discretion of each jurisdiction, but opportunities for cross-jurisdictional collaboration are also encouraged.

Funding will be the critical factor impacting the implementation of mitigation strategies. Low-cost strategies or those with existing funding through local Capital Improvement Programs or other funding sources offer opportunities for jurisdictions to make immediate progress toward reducing their risk. Projects requiring significant funding or additional planning may be accomplished through strong local and regional support. The various FEMA hazard mitigation programs, along with other funding sources, can be leveraged together to complete any level of mitigation actions (see Integration with Existing Plans). Jurisdictions are encouraged to coordinate with Morgan County, Utah Department of Emergency Management, and FEMA to develop grant projects.

Each action has been assigned to a specific role or a local government office responsible for implementing that action. Because each jurisdiction has specific mitigation actions to implement, it is in charge of tracking progress for each action. Jurisdictions may update their specific sections of the plan by submitting them to the emergency management staff at Morgan County at any time. The jurisdictions may also bring up changes at the yearly HMP review. Plan amendments will be coordinated with Morgan County and submitted to the State of Utah and FEMA. Any changes to data, maps, actions, priorities, and other information are welcomed throughout the next five years.

Integration with Existing Plans

It will be the responsibility of each participating jurisdiction to determine integration procedures. As local planning documents are updated, all participating jurisdictions will integrate their mitigation strategies into the new planning documents. These documents could include, but are not limited to:

- General Plan
- Land Use Ordinances and/or Zoning Codes
- Subdivision Ordinances
- Capital Improvement Plans
- Economic Development Plans
- Stormwater Management Plans
- Floodplain Management Plans
- Natural Resource Protection Plans
- Wildfire Protection Plans
- Emergency Operation Plans
- Parks and Open Space Plans

At the yearly monitoring and evaluation meeting hosted by Morgan County Emergency Management, jurisdictions will be asked to share potential opportunities to integrate the HMP into planning documents in the coming year. The planning team can then share resources and case studies to help support that integration. Jurisdictions will also share examples of integration that has taken place over the past year. Morgan County Emergency Management will document these examples of integration.

Plan Monitoring

The implementation of the plan will be tracked annually, two to three months before the hazard mitigation grant applications are due. During this time, Morgan County Emergency Management staff will survey the progress of all plan participant toward completion of mitigation actions, including the actions that have been completed, any obstacles or impediments to implementing actions, any actions that are no longer feasible, and any other comments jurisdictions have submitted about the plan and their progress. Staff will provide a summary of implemented strategies and community comments for the Morgan County Council to review. Based on the review, the council will make recommendations on changes in monitoring and/or updating the plan.

Plan Evaluation

The Morgan County EM staff will evaluate the plan on an ongoing basis and will conduct a formal review once a year, in conjunction with the annual plan monitoring review. The formal evaluation will include a review of:

- Natural hazard events that have occurred in the past year and any actions needed in communities impacted
- Mitigation actions that have been implemented
- Any mitigation actions to prioritize for the next year
- Communities needing assistance in implementing and/or applying for funding
- Changes to funding options and planning policies related to the PDMP process and grants
- Any significant new data or maps that affect the accuracy of the analysis or information in the plan
- Staff or elected official turnover

This evaluation process ensures that the HMP remains relevant, effective, and aligned with evolving risks, regulatory requirements, and operational challenges within participating jurisdictions and the State of Utah. The Morgan County Emergency Management staff will document any changes, which can then be included in the next plan update.

Plan Update

Morgan County Emergency Management staff will update the plan. As needed, funding should be sought at least three years before the expiration date of the current plan. The plan update should begin at least two years prior to the expiration of the current plan, to ensure that the plan remains compliant with state and federal regulations. The plan update involves a comprehensive review and evaluation of each section of the plan and also discusses the results of evaluation and monitoring activities detailed in the Plan Maintenance section. Continual data gathering based on ongoing mitigation activities will take place and be applied to the updated plan.

At the time of each update, Morgan County Emergency Management staff shall consult with the Utah Division of Emergency Management and FEMA to obtain the latest guidance and ensure the update meets current criteria.

Continued Public Involvement

Throughout the next five years, the public will be continuously notified of plan changes through the social media accounts and websites of participating jurisdictions. In addition, Morgan County will encourage communities to continue to educate and inform residents about natural hazard mitigation by providing mitigation resources through the Emergency Management staff.

Annually, a presentation based on the plan monitoring and evaluation will be given to the public at a Morgan County Council meeting. Public comments will be solicited through area newspapers and the Morgan County website. The public will be able to submit comments in person, over the phone, via e-mail, or in a written response.

The public will be encouraged to provide feedback to the Morgan County Emergency Management staff on the Morgan County website at any time during the five-year period. The website will host the most up-to-date version of the plan, provide a place for the public to submit feedback on the plan directly to Emergency Management staff, and announce any updates. A hard copy of the plan will be available at the Morgan City office.

As mitigation actions become implemented, interesting and inspiring projects will be highlighted through various communication channels available to public and elected officials, such as the Morgan County website, the Utah Community Development Office newsletter, the American Planning Association Utah Chapter newsletter, local newspapers, and other public-interfacing websites and newsletters. In addition, as tools and other resources become available, Morgan County will advertise them via newsletters, e-mail, and website posting. In particular, a natural hazard viewer is being developed for the State of Utah for public viewing. Residents and officials will be notified once this invaluable tool is released.

Unincorporated Morgan County Annex

Introduction

Unincorporated Morgan County comprises the rural communities, agricultural lands, and foothill neighborhoods outside Morgan City, including Mountain Green, Milton/Littleton, Peterson, Porterville, Richville, Croydon, Enterprise, and dispersed canyon and valley settlements. These areas collectively house the majority of the County's population, which reached approximately 12,600 residents in 2023 according to countywide population estimates.[159]Population growth has been especially concentrated in Mountain Green and Morgan Valley, areas influenced by proximity to Interstate 84 (I-84), the Weber River corridor, and developable valley floors. As a result, many residents live in close proximity to steep slopes, wildfire-prone foothills, floodplains, and constrained transportation corridors.

The County's physical landscape is defined by the Wasatch Range to the west and the Uinta Mountains to the east, with elevations ranging from roughly 4,700 feet in valley bottoms to over 9,000 feet on surrounding ridgelines. The Weber River runs the length of the County and provides water supply, irrigation, recreation, and hydrologic connectivity for these communities. The Weber River Basin Climate Vulnerability Assessment documents a 1.6°F increase in average temperature since 1985, earlier snowmelt, and increasing evaporative demand, all of which influence local flood, drought, and wildfire behavior[160]. These climatic shifts interact with rapid residential development and limited transportation redundancy to shape the County's hazard exposure.

Public engagement conducted for the 2022 Morgan County General Plan update highlighted concerns about water capacity, transportation congestion, hillside development, community fire risk, and the loss of agricultural and open lands. The appendices include 33 water-capacity–related comments, 19 transportation-related comments, and widespread opposition to intensified development in Porterville, Richville, and Milton. These concerns align closely with hazard conditions documented in risk assessments. Countywide First Street Foundation risk data indicate that approximately 99% of properties have some level of modeled wildfire exposure, while approximately 32.2% (2,529 properties) have measurable riverine or pluvial flood risk. Heat risk is also increasing, with very hot days projected to rise from approximately 7 to 16 days per year over the next 30 years, consistent with regional climate projections used in County planning analyses.

[159] (U.S. Census Bureau, American Community Survey 5-Year Estimates (Morgan County, Utah), 2023, https://www.census.gov/programs-surveys/acs).
[160] Weber Basin Water Conservancy District, Weber River Basin Climate Vulnerability Assessment, 2021, observed warming of ~1.6°F across river sub-basins over ~40 years, https://wwa.colorado.edu/sites/default/files/2021-08/Weber_River_Basin_Climate_Vulnerability_Assessment.pdf

Critical Infrastructure and Key Resources

Unincorporated Morgan County depends on a dispersed network of transportation, water, utility, and public-safety systems that support its rural communities and rapid residential growth. I-84 is the County's primary lifeline, running along the Weber River and serving as the main access route for Mountain Green, Peterson, Croydon, and Morgan Valley. Many County facilities and emergency services rely on this corridor for daily operations and emergency access, and the same is true for residents, fire and Emergency Medical Services (EMS) providers, and essential goods movement. Local collectors such as Morgan Valley Drive, Old Highway Road, and Trapper's Loop provide secondary access but are vulnerable to winter storms, landslides, and wildfire-related closures. Public comments from the General Plan appendices cite significant concerns about roadway capacity, congestion, and safety in these areas, underscoring transportation as a critical resource and vulnerability.

Water, wastewater, and stormwater systems in the unincorporated area are provided by a combination of special service districts, private water companies, and onsite septic systems. Mountain Green and other unincorporated communities rely on these entities, and the same system characteristics apply countywide: limited redundancy, dependence on groundwater and localized sources, and sensitivity to drought and water-quality issues. Climate assessments documenting earlier snowmelt, decreasing lower-elevation snowpack, and rising evaporative losses highlight the long-term vulnerability of these systems. Community survey responses and comment maps show widespread concern about water-supply adequacy, particularly in Mountain Green and Milton.

Electric service to the unincorporated area is primarily provided by Rocky Mountain Power, with Morgan City Utilities serving limited areas near the city boundary. Rocky Mountain Power is upgrading the Mountain Green substation to meet increasing demand, reflecting the rapid load growth in west-side communities. Power lines traverse canyon and foothill terrain, and wildfire modeling identifies nearly universal property-level wildfire exposure, making electric infrastructure both a potential ignition source and a critical vulnerability during high-wind or red-flag conditions. Communications infrastructure is improving but remains inconsistent in several canyon locations, which can affect access to emergency alerts and interagency coordination during hazard events.

Fire protection in unincorporated Morgan County is provided by Morgan County Fire and the Mountain Green Fire Protection District. Law enforcement is provided by the Morgan County Sheriff's Office. The capability assessment confirms the presence of an Emergency Manager, a Fire Safe Council, and trained staff across departments. These services face seasonal access limitations from winter storms, steep terrain, and a growing wildland–urban interface. Public safety resources are further influenced by population growth in areas with limited egress and roadway constraints.

Agricultural lands, open spaces, and riparian corridors also function as key resources. Public input at planning workshops emphasized strong interest in preserving these lands, which provide natural buffers that reduce wildfire spread, absorb stormwater, and limit development in high-risk areas. However, ongoing subdivision activity in Mountain Green, Morgan Valley, and Milton continues to alter where and how these resources function within the built environment.

Overall, unincorporated Morgan County's critical infrastructure and key resource systems are shaped by the linear Weber River/ I-84 corridor, a mix of decentralized utility networks, and the expanding interface between development and natural hazard zones. As growth continues, transportation, water supply, power reliability, and fire protection capacity remain central considerations for local hazard mitigation and resilience planning.

Hazard Identification

Table 46 identifies the natural hazards evaluated for this planning area and indicates which hazards are applicable based on local conditions and available data.

Table 46: Hazards Identified and Exceptions for Unincorporated Morgan County

Hazard	Applicable	Not Applicable	Rationale for Not Including
Avalanche	X		
Dam Failure	X		
Drought	X		
Earthquake	X		
Erosion	X		
Extreme Cold	X		
Flood	X		
Hail	X		
High Wind	X		
Landslides	X		
Problem Soils	X		
Radon	X		
Snowstorms	X		
Wildfire	X		

Vulnerability Analysis

Overall Vulnerability and Impact Summary

Unincorporated Morgan County includes approximately 8,317 residents (as of the 2023 American Community Survey) living in communities such as Mountain Green, Milton/Littleton, Peterson, Porterville, Richville, Croydon, and Enterprise. These areas are located in the Weber River valley and adjoining

foothills, where topography, development patterns, and proximity to natural features create multi-hazard exposure. Countywide, approximately 12,600 residents rely on lifelines that pass through unincorporated areas, including I-84, electric transmission corridors, potable water systems, and school bus routes. Growth in Mountain Green and Morgan Valley has increased the number of homes and people in wildfire-prone foothills, flood-exposed river corridors, and areas with slope instability and problem soils.

Hazard data from the First Street Foundation show that approximately 99% of properties in Morgan County (7,848 properties) have measurable wildfire risk, with foothill communities facing the greatest exposure. Flooding also presents a substantial threat - 32.2% of properties (2,529 properties) have pluvial or fluvial flood risk, including areas near the Weber River and its tributaries in Mountain Green, Peterson, and Morgan Valley[161]. Climate-driven heat is increasing as well, with very hot days projected to rise from approximately 7 to 16 days per year over the next 30 years. Poor air quality affects thousands of residents, including children and older adults who are more sensitive to smoke and ozone. The Weber River Basin Climate Vulnerability Assessment documents a 1.6°F increase in average temperature since 1985, earlier snowmelt, reduced snowpack at lower elevations, increasing drought risk, and greater hydrologic variability.

Unincorporated Morgan County has relatively low overall social vulnerability but includes groups with elevated hazard sensitivity. The community profile identifies 2,107 children under age 14 (approximately 26%), 942 adults over age 65 (approximately 12%), and 117 residents living below the poverty level; these groups face higher risk during disasters due to limited mobility, increased medical needs, or resource constraints. Community comments recorded during the 2022 General Plan process expressed significant concern about water system capacity (33 comments), roadway congestion (19 comments), hillside development, and fire risk in Mountain Green, Milton, Porterville, and Richville. These concerns align with documented exposure to wildfire, slope instability, drought, and limited transportation redundancy.

AVALANCHE

VULNERABILITIES

Avalanche is ranked lowest by risk score (Calculated Priority Risk Index [CPRI] score of 1.95) for the County due to exposure being limited to steep mountain slopes and canyon corridors. Most of the Morgan County population and infrastructure is located in Morgan Valley where there is little chance of avalanche damage. Vulnerability is focused on East Canyon, specifically around East Canyon Reservoir and East Canyon Park. Recreationists and transportation infrastructure around East Canyon Park are vulnerable to impacts from avalanches. The same is true for Upper Weber Canyon, Hardscrabble Canyon, Lost Creek Drainage, and, to a lesser extent, Trappers Loop (SR-167) in Mountain Green.

Countywide datasets delineating mapped avalanche paths or runout zones are limited, so a quantitative analysis of critical facilities or other assets exposed to avalanche hazards was not feasible at the time of this plan update.

[161] First Street Foundation, Risk Factor Wildfire Model (Morgan County, Utah), 2024, https://riskfactor.com

IMPACTS

In East Canyon Park and Reservoir, Upper Weber Canyon, Hardscrabble Canyon, and Lost Creek Drainage, the primary impact on people is the health and safety of recreationalists using the areas for hiking, snowshoeing, or skiing. Avalanches in these areas can occur quickly, injuring or even killing individuals nearby. Avalanches can also damage transportation infrastructure by burying roads and trails, including Hardscrabble Road, State Route 66 (SR-66), and Lost Creek Road.

In Mountain Green, impacts are concentrated on transportation and utility infrastructure. Trappers Loop winds north of Mountain Green through the Wasatch Mountains to Huntsville in Weber County. Avalanches along the steep slopes on either side of the road can block or damage access and utility poles, potentially restricting energy access to nearby communities.

DAM FAILURE

VULNERABILITIES

Dam failure is given a CPRI score of 2.45 due to a low probability of occurrence but high consequence if it does occur. Critical infrastructure in the County—including roads, bridges, and facilities—would be vulnerable to damage if the Northwest Reservoir, Cobble Creek Dam, East Canyon Dam, or Lost Creek Dam were to fail. SR-66 and SR-167, as well as utilities located within these corridors, are particularly vulnerable. Mountain Green subdivisions, roads, and utility infrastructure downstream of Cobble Creek Dam and the Northwest Reservoir are also vulnerable to dam failure. The vulnerable communities include homes along Wasatchback Drive, South Shoreline Drive, and Silver Leaf Drive in Mountain Green.

Using potential inundation boundaries provided by the U.S. Bureau of Reclamation and the Utah Division of Water Resources, Table 47 lists the number of critical facilities within the County that lie within areas at risk from dam failure. No inundation mapping data were available for Cobble Creek Dam at the time of this analysis, and it is therefore omitted from the quantitative assessment. Table 48 identifies other community assets exposed to dam failure, including housing, population, and building values.

Table 47: Critical Facilities in Dam Inundation Boundaries[162]

Facility Type	Facility Count (Total)	Facilities in Potential Inundation Area					
		East Canyon Dam	Echo Dam	Lost Creek Dam	Northwest Dam–East	Northwest Dam– West	Silver Leaf Dam
Fire Stations	2	1	2	1	1	0	0
Police Stations	1	1	1	1	0	0	0
Medical Facilities	2	1	1	1	0	0	0
Emergency Facilities	3	1	2	1	0	0	0
Civic Buildings	3	2	2	2	0	0	0
Schools	4	3	3	3	0	0	0
Public Works Facilities	8	5	5	5	0	1	0
Helicopter Landing Sites	3	0	0	0	0	0	0
Multi-Family Buildings	5	5	5	5	0	0	0
Parks	6	4	4	4	0	1	0
Churches	9	3	4	2	0	1	0
Total	**46**	**26**	**29**	**25**	**1**	**3**	**0**

[162] **Note:** Facilities may be located within the inundation boundaries of more than one dam; therefore, counts by dam may exceed the total number of facilities listed.

Table 48: Assets Exposed to Dam Failure[163]

Community Assets	Unincorporated County (Total)	Exposure in Potential Inundation Area					
		East Canyon Dam	Echo Dam	Lost Creek Dam	Northwest Dam–East	Northwest Dam–West	Silver Leaf Dam
Total Acres	384,859	15,143	13,719	22,744	1,144	2,221	957
Housing Units	2,414	512	461	427	0	33	0
Population	8,210	1,532	1,375	1,280	0	83	0
Total Market Value	$4,678,408,255	$855,835,231	$692,714,651	$653,687,056	$92,631,813	$108,156,743	$20,344,929
Taxable Value	$2,418,280,294	$386,320,398	$338,730,523	$288,466,280	$45,917,454	$54,423,806	$5,284,250
Building Value	$1,960,782,984	$381,997,617	$317,965,766	$271,372,323	$38,296,694	$41,915,226	$5,384,023

[163] **Note:** Assets may be located within the inundation boundaries of more than one dam; therefore, counts by dam may exceed the total values listed.

IMPACTS

If the Northwest Reservoir, Cobble Creek Dam, East Canyon Dam, or Lost Creek Dam were to fail, impacts could include damage to roads, bridges, and utility infrastructure, as well as potential injury or loss of life to individuals nearby. Failure of East Canyon Dam would lead to damage to SR-66, adjacent communities such as Whites Crossing, and utility infrastructure along the corridor. Lost Creek Dam failure would damage Lost Creek Road and flood the community of Croydon, located at the end of Lost Creek Canyon. Failure of the Northwest Reservoir would flood and damage SR-167, blocking routes north to Huntsville, while failure at the Cobble Creek Dam would flood homes in West Mountain Green. For all of these failures, individuals using the roads or trails downstream of the dams would be at risk of injury or death from flooding.

DROUGHT

VULNERABILITIES

Drought is a high-frequency hazard with high severity that affects water supply and agriculture. Drought has a CPRI score of 2.95. The plan notes that Morgan County is generally cooler and wetter than much of Utah but still experiences near-annual drought impacts on reservoirs and canals. Drought contributes to problem soils, which are also ranked high (CPRI 2.95) due to expansive and collapsible soils in valley developments that can damage foundations, pipelines, and pavements. All residents of Morgan County are vulnerable to drought, but those who rely on a steady water supply for commercial reasons, such as agricultural producers, are particularly vulnerable.

Drought conditions occur across large geographic areas, so all critical facilities, infrastructure, populations, and other community assets are potentially exposed during drought events.

IMPACTS

The impacts from drought can be severe for both the population and infrastructure of unincorporated Morgan County. Major roads in the County, like I-84, SR-100, and SR-167, could all face cracking and deterioration due to drought and the ensuing soil shrinkage. Deterioration of these roads can disrupt transportation in the County and lead to increased maintenance costs. For people in the County, particularly those in the agricultural sector, drought can cause significant disruptions to work and local economic activity. Many businesses that support residents of the County cannot function without a steady water supply. If severe drought occurs, these businesses could be substantially impacted.

EARTHQUAKE

VULNERABILITIES

Unincorporated Morgan County lies near active fault structures associated with the Wasatch Front and Wasatch Back, including mapped Quaternary faults such as the East Canyon and Saleratus Creek faults identified in regional hazard assessments. A large earthquake (M6.5–7.0) on these segments could cause strong ground shaking throughout valley and foothill communities, particularly where homes are located on deep alluvial soils or near steep canyon walls. Due to this risk, earthquakes were ranked second in the updated hazard prioritization for this plan (CPRI 3.25). The 2021 Pre-Disaster Mitigation (PDM) Plan identifies earthquakes as "multi-hazard events" with a high probability of future occurrence and severity ranging from "limited" to "catastrophic." Unincorporated communities rely heavily on I-84, local bridges, and the Weber River corridor, all of which are vulnerable to disruption from ground shaking. Older residential structures, unreinforced components, and buildings on problem soils may experience higher levels of damage. Secondary hazards include landslides, rockfall in canyon areas, dam failure along upstream reservoirs, and damage to power and water lines that traverse foothill terrain.

As shown the ground shaking potential map included in the base plan, all critical facilities are vulnerable to strong to severe ground shaking from an earthquake. Power, water, transportation, and communication infrastructure throughout the County are also exposed and vulnerable to damage. Unreinforced masonry (URM) buildings are particularly vulnerable to damage from ground shaking. General building stock data from HAZUS 6.1 indicates that there are 560 URM buildings within Morgan County. Morgan County parcel data includes the year built for 1,205 structures in unincorporated Morgan County[164].Of those, 463 were built prior to 1973, when seismic building codes were introduced. An additional 768 were built before 1987, when statewide seismic building codes were adopted. Structures built prior to these building codes are more vulnerable to damage.

IMPACTS

A major earthquake could result in injuries or fatalities, widespread structural and non-structural damage, and prolonged loss of access to essential services. Homes, businesses, and agricultural facilities across Mountain Green, Milton/Littleton, Porterville, and Morgan Valley could experience falling interior hazards, compromised utilities, and displacement of residents. Disruption of I-84, local bridges, and canyon roads could impede emergency response and isolate neighborhoods, particularly those with limited egress. Water systems—including private wells, small water company infrastructure, and irrigation networks—may experience outages or contamination. Extended power loss could affect heating during winter months and the communications needed for emergency coordination. Combined with landslide- or dam-related impacts, a strong earthquake would significantly affect life safety, mobility, and the continuity of essential services in unincorporated Morgan County.

[164] Federal Emergency Management Agency (FEMA), HAZUS-MH 6.1 General Building Stock Data (Morgan County, Utah), 2023, FEMA software dataset.

Approximately 98% of structures in Morgan County are residential. Based on that percentage, an estimated 548 of the URM buildings in Morgan County are residences. Given the average household size in Morgan County of 3.49[165], an estimated 1,912 residents could be displaced from these homes. Damage to these and other structures could also lead to injuries to occupants.

The total market value of properties exposed to earthquake hazards in Morgan County is approximately $5.66 billion, with approximately $2.64 billion related to building values.

EROSION

VULNERABILITIES

The primary areas vulnerable to erosion in unincorporated Morgan County are East Canyon/Porterville, the Lost Creek drainage, Hardscrabble Canyon, and the Mountain Green foothills. These areas are steep and experience seasonal runoff and sedimentation that can undermine roads, agricultural lands, and buildings. In particular, I-84, SR-66, and SR-167 are all vulnerable to erosion during heavy rainfall. Canals, creeks, and culverts in the Lost Creek drainage are also vulnerable, as are subdivisions in Mountain Green.

Based on Natural Resources Conservation Service (NRCS) soils data, a total of 19,107 acres in Morgan County are in areas with moderate erosion hazard potential, and 608,422 acres are in areas with severe erosion hazard potential.

Four critical facilities, including three churches and Croydon Park, are located within areas of moderate erosion hazard. Four additional facilities—Morgan County Search and Rescue, Family Tree Assisted Living Center, a state road shed, and the Highland Water Company—are in areas of severe erosion hazard. Except for the Highland Water Company, the facilities in severe erosion hazard areas are within the Morgan City boundary. Using the Federal Emergency Management Agency's (FEMA) USA Structures data, Table 49 estimates the number of structures in erosion hazard areas.

Table 49: Structures in Erosion Hazard Areas

Occupancy Type	Moderate Hazard	Severe Hazard
Residential	860	1,030
Education	0	1
Government	0	2
Utility and Miscellaneous	0	1
Unclassified	94	215
Total	954	1,249

[165] U.S. Census Bureau, QuickFacts: Morgan County, Utah, 2024, https://www.census.gov/quickfacts

IMPACTS

Erosion impacts people and infrastructure by wearing away, detaching, and transporting soil necessary for structural stability. For roads, including I-84, SR-66, and SR-167, heavy rainfall along nearby steep slopes can erode soil from beneath roadbeds, jeopardizing road foundations. Erosion can also deposit debris on roadways, causing delays and safety hazards. Erosion can remove topsoil from agricultural lands—particularly in Porterville, Enterprise, and Milton—impacting long-term soil fertility and productivity. Subdivisions that abut steep slopes, such as areas in southeastern Mountain Green, can experience erosion that damages houses or local roads, affecting the ability of residents to safely live and travel in these areas.

A total of 1,890 residences are located in moderate or severe erosion hazard areas, which could potentially affect an estimated 6,596 residents.

EXTREME COLD

VULNERABILITIES

Extreme cold poses significant risks to both the population and infrastructure of Morgan County, Utah. The County, characterized by its mountainous terrain and variable climate, can experience severe winter storms and frigid temperatures that threaten the well-being of residents, particularly the elderly, children, and those with preexisting health conditions. Roads and drivers are also vulnerable due to icy conditions that can form. Extreme cold is also identified as a frequent hazard in the County hazard prioritization (CPRI 2.63).

Extreme cold occurs over large areas, and all facilities, structures, populations, and other community assets are potentially vulnerable.

IMPACTS

Prolonged exposure to extreme cold can lead to hypothermia and frostbite, while increased heating demands can strain energy resources and lead to power outages. The elderly, children, and those with preexisting health conditions are most likely to experience the impacts of extreme cold. Additionally, icy conditions can create hazardous travel situations, impacting transportation and emergency services. Infrastructure such as water supply systems and roads may suffer from freeze-thaw cycles, leading to potential damage and costly repairs.

FLOOD

VULNERABILITIES

Flooding (CPRI 2.75) affects riverine areas along the Weber River and its tributaries, as well as localized pluvial flooding in developed valley bottoms. County facilities and key access routes in Morgan City and Mountain Green lie within these valley systems, near rivers, canals, and storm drain networks.

Using geographic information system (GIS) overlay analysis, critical facilities data provided by Morgan County were overlaid with FEMA Digital Flood Insurance Rate Maps (DFIRMs). Three facilities were identified within the County in Special Flood Hazard Areas (SFHAs). Kent Smith Park and a sewer treatment plant are in an area with reduced flood risk due to a levee. The Morgan County Fairgrounds are within the floodway.

Based on Morgan County parcel data, the market value of properties in the 1% annual chance floodplain is $112,255,159, with a total building value of $33.6 million. The market value of properties in the 0.2% annual chance floodplain is $21,987,271, with a total building value of $6.9 million.

FEMA's USA Structures building footprint data, overlaid with the SFHAs, indicate a total of 204 structures within the 1% annual chance flood area. Of these, 128 are residences, 75 are unclassified, and 1 is a utility structure. Thirty-five structures are in the 0.2% annual chance area, including 25 residences and 10 unclassified buildings.

Census block data within Morgan County, overlaid with SFHAs, indicate that approximately 120 housing units and 346 people are in the 1% annual chance area. However, a limited number of blocks were selected, using only those that had their center within the flood zone. This was to avoid overcounting the population by using all blocks that intersected the floodplain. Another approach is to use the building footprint data to estimate population. Based on 128 residences within the 1% annual chance flood area and the average household size of 3.49, approximately 447 individuals reside in the 1% hazard area. An estimated 87 individuals are in the 0.2% annual chance hazard area.

IMPACTS

Impacts from flooding are particularly pronounced in several communities in Morgan County:

- **Mountain Green (Unincorporated):** Rapid residential and mixed-use development has led to increased impervious surface coverage and modified drainage pathways. Flash flooding in steep tributary drainages and localized ponding in poorly drained zones are growing concerns. Wildfire burn scars in adjacent foothills elevate the risk of debris-laden flood events.
- **Milton, Enterprise, and Peterson:** These communities, located in low-lying areas adjacent to the Weber River and its tributaries, experience seasonal flooding risk, particularly during high snowpack years or spring rain-on-snow events. Floodwaters may overtop banks, inundate farmland, and damage rural infrastructure.

- **Porterville and Richville:** These agricultural communities are situated near natural drainage pathways and are vulnerable to overland flow and sheet flooding, especially during convective storm events. Limited structural flood protection infrastructure exists.

HAIL

VULNERABILITIES

The County's geographical features, including its elevation and mountainous terrain, can create conditions conducive to intense weather events, including hailstorms. These storms can produce hailstones of varying sizes, with the maximum recorded in Morgan County being 1 inch in diameter. Facilities, homes, and vehicles across the County are vulnerable to damage from hail, as is the health of individuals caught outdoors in a severe hailstorm.

IMPACTS

Large-diameter hail can break windows in vehicles, facilities, and homes, causing extensive damage. This damage can also expose facilities, homes, and vehicles to further damage from exposure to precipitation and wind. The accumulation of hail on roadways can lead to unsafe driving conditions, increasing the number of accidents on thoroughfares like I-84. If people are exposed to hail without being able to find adequate shelter, they could suffer injuries, depending on the size of the hail.

HIGH WIND

VULNERABILITIES

Nestled in the Wasatch Range, the County experiences strong gusts, particularly during seasonal changes when atmospheric pressure shifts occur. These winds can pose risks to structures, trees, and power lines. Downed power lines can cause power outages, which in turn can affect vulnerable populations such as the elderly and those with medical conditions that rely on a steady power supply. Older structures in the County are particularly vulnerable to high winds, as they were likely built to lower building standards than modern buildings. Rural roads in the County, like SR-100E and SR-167, are vulnerable to being blocked by falling trees.

High wind conditions occur across large geographic areas, so all critical facilities, infrastructure, populations, and other community assets are potentially exposed when high wind events occur.

IMPACTS

Downed power lines from high winds can have severe impacts on the electrical infrastructure of Morgan County and its residents. Many critical functions in the County rely on electrical power, including administrative buildings, fire stations, and water treatment facilities. Residents would also feel the impacts of power outages, including extreme heat or cold exposure and health impacts for those with medical

conditions. Roads can be damaged by falling trees, and access can be cut off for residents who use those roads.

LANDSLIDES

VULNERABILITIES

Landslides occur throughout Morgan County but are concentrated in areas with steep slopes, weak geologic formations, and significant elevation changes. The areas most vulnerable to landslides include the following:

- Trappers Loop (SR-167), characterized by deep-seated rotational slides and slope creep affecting road cuts and adjacent hillsides.
- Mountain Green Bench and Durst Mountain, where clay-rich soils and ancient slide deposits are prone to reactivation during wet years. Neighborhoods on the west side of Mountain Green are most vulnerable to impacts from landslides.
- Weber Canyon and East Canyon, areas that experience frequent rockfall, debris slides, and shallow slope failures due to steep bedrock exposures and rapid snowmelt runoff. Roads and utility lines are vulnerable in these areas.
- Peterson Creek and Hardscrabble drainage areas, where older landslide complexes remain dormant but could reactivate with saturation or seismic shaking.

Mountain Green Fire Protection District and Mountain Green Fire Department are in areas of moderate landslide susceptibility. Two public works facilities and two churches in the Mountain Green area are in areas of low landslide susceptibility. The total market value of unincorporated properties exposed to moderate or high landslide susceptibility is over $2 billion, based on Morgan County parcel data. The building value of these properties totals $622 million.

Using building footprints from FEMA's USA Structures data, the following counts of structure types are in either moderate or high landslide susceptibility areas (see Table 50). Most of the properties exposed to landslide susceptibility are residences. Based on an average household size of 3.49 in Morgan County, an estimated 3,462 people reside in areas of moderate or high landslide susceptibility.

Table 50: Structures in Landslide-Susceptible Areas

Occupancy Type	Moderate Susceptibility	High Susceptibility
Residential	754	238
Unclassified	156	19
Commercial	2	0
Education	0	0
Government	0	0

Occupancy Type	Moderate Susceptibility	High Susceptibility
Utility and Miscellaneous	1	0
Total	**913**	**257**

IMPACTS

Residential developments on benches and alluvial fans—especially near Mountain Green, Milton, and Peterson—sit adjacent to mapped landslide deposits. Critical facilities such as schools, fire stations, and public works yards in these areas may experience access disruption or utility damage, even if direct slope failure does not occur on the site. Rural agricultural lands in valley bottoms face lower risk overall but may experience blocked irrigation channels or sedimentation when debris flows emerge from canyon mouths. People may be injured or killed as a result of landslides.

PROBLEM SOILS

VULNERABILITIES

Roads across the County are the primary pieces of infrastructure vulnerable to problem soils, including expansive soils and land subsidence. Local roads in Croydon, Enterprise, and Mountain Green and I-84 are particularly vulnerable to being impacted by problem soils. The residents who use these roads could be forced to take long detours or, in the worst case, be cut off due to damage on these roads from land subsidence or expansive soils.

While data describing soil types is available in Morgan County, supplementary information to clarify the soil classifications and which soils could be considered "problem soils" was unavailable at the time of this plan update. This limited the ability to conduct a quantitative analysis of critical facilities or other assets exposed to the problem soils hazard.

IMPACTS

Roads in Croydon, Enterprise, and Mountain Green as well as I-84 could experience cracking and instability due to problem soils. Under an extreme, but unlikely, scenario, the instability could require these roads to be closed and repaired. In this scenario, travel for residents in the affected area would be delayed, and they could be isolated for a short period of time. More likely, the slight cracking caused by problem soils would require minor repairs more frequently than on an average road.

RADON

VULNERABILITIES

Radon ranks first in the updated hazard prioritization (CPRI 3.3). Morgan County is classified as U.S. Environmental Protection Agency (EPA) Zone 2 (2–4 picocuries per liter [pCi/L]), with elevated indoor

radon levels documented in basements and older structures. Buildings with slab-on-grade construction, crawlspaces, or basement areas—particularly older buildings—may accumulate radon if not properly tested and mitigated.

Radon occurs naturally and can be found across much of Morgan County. Populations throughout the County may be exposed to various concentrations of radon. Because the accumulation of radon in buildings varies both with the location of the structure and with various factors in building construction characteristics mentioned above, currently the best way to determine vulnerability in critical facilities and other structures is to use radon testing kits in individual structures.

IMPACTS

Radon is a long-term, chronic health hazard rather than an acute life-safety threat. Unmitigated radon exposure increases lifetime lung cancer risk for residents who spend many hours in ground-floor or basement rooms. Testing, mitigation, and ongoing monitoring in buildings are therefore critical for protecting indoor air quality.

SNOWSTORMS

VULNERABILITIES

Snowstorms (CPRI 3.0) and extreme cold (2.63) are frequent and disruptive. County planning documents note frequent heavy snow events that affect canyon routes, utilities, and emergency access. Communities located on steep, winding roads and along I-84 are most vulnerable to the impacts of snowstorms. These communities include Mountain Green, Croydon, and White's Crossing.

Snowstorm conditions occur across large geographic areas, so all critical facilities, infrastructure, populations, and other community assets in Morgan County are potentially vulnerable to these storms.

IMPACTS

Impacts include downed utility lines leading to power outages, reduced visibility on roads across the County leading to traffic accidents, and heavy snowfall and ice that block transportation routes. Without power, residents may not have access to heat or water if their well operates on electricity. Remote communities that largely rely on a single road for ingress and egress—including Croydon, White's Crossing, and parts of Mountain Green—may be particularly impacted.

WILDFIRE

VULNERABILITIES

Wildfire has a CPRI score of 2.9 and is amplified by climate change, drought, and steep slopes. First Street Foundation analysis shows that 99% of properties in Morgan County have some wildfire risk, with

approximately 17% of properties at "Major" or higher risk. Mountain Green and other west-slope communities are specifically identified as wildland–urban interface (WUI) areas with high exposure.

Using the Structure Exposure Score GIS data from the Utah FFSL Wildfire Risk Assessment Portal and Morgan County parcel data, an estimated $1.04 billion in building values is in areas with an exposure class of High to Extreme. Based on FEMA's USA Structures building footprint data, the following counts of structures are in these same high exposure areas (see Table 51).

Table 51: Structures in High-to-Extreme Wildfire Exposure Areas

Structure Category	Building Count
Residential	1,507
Education	4
Government	2
Utility and Maintenance	1
Unclassified	310
Total	1,824

Furthermore, four facilities from Morgan County's critical facilities inventory are in areas where the structure exposure class is high to extreme. Morgan County Search and Rescue, Mountain Green Elementary, Morgan County Fairgrounds, and the Morgan County Public Works facility located in Morgan City.

IMPACTS

Wildfire impacts include the following:

- Direct threat to homes and facilities in WUI areas. Communities directly adjacent to I-84 along Morgan Valley, including Mountain Green and Enterprise, could be particularly impacted by a wildfire.
- Smoke and poor air quality, which can force cancellation of outdoor activities and impact resident health, even when fires burn in neighboring counties.
- Evacuation and shelter-in-place decisions can force residents out of the County, disrupting education for children and work for adults.

Population Exposure and Social Vulnerability

Unincorporated Morgan County includes 8,317 residents as of the 2023 American Community Survey, with a large share of families living in Mountain Green, Peterson, Milton/Littleton, Porterville, Richville, and other valley and foothill communities. The population skews young, with 2,107 children under age 14 (26%) and 942 adults over age 65 (12%), representing groups with higher sensitivity to extreme cold, heat, smoke, and disruptions to utilities and transportation. Although only 117 residents live below the poverty

level, lower-income households may face barriers to home hardening, radon mitigation, and evacuation during emergencies.

Countywide social vulnerability is relatively low, supported by high incomes and strong employment, but public engagement reveals localized concerns about water-system reliability, evacuation constraints, and growth in wildfire-prone foothills. Climate-risk data show worsening environmental stressors: 4,267 children/teens and 1,540 older adults are exposed to degraded air quality, and extreme heat days are projected to grow from 7 to 16 days per year within 30 years. These factors, combined with the area's topographic isolation and dependence on I-84 for access, contribute to uneven capacity among households to prepare for, respond to, and recover from natural hazards.

Critical Facilities and Lifelines at Risk

Unincorporated Morgan County relies on a network of lifelines that support dispersed rural communities and growing population centers in Mountain Green and Morgan Valley. The primary transportation route is I-84, which carries residents, emergency services, and essential goods through narrow canyon areas that are vulnerable to snowstorms, rockfall, landslides, wildfire smoke, and post-earthquake damage. Local roads such as Morgan Valley Drive, Old Highway Road, and Trapper's Loop provide secondary access but face congestion, drainage issues, and winter travel challenges identified in public comments (19 comments).

Water supply is provided by a mix of private water companies, wells, and small districts, while sewer service varies between septic, Morgan City sewer, and the Mountain Green Sewer Improvement District. These systems are sensitive to drought, contamination, and infrastructure aging, with 33 public comments raising concerns about water capacity. Electric power is delivered primarily by Rocky Mountain Power, whose Mountain Green substation is being upgraded to meet increased demand. Communication services are improving but remain inconsistent in canyon areas. Fire protection is provided by Morgan County Fire and the Mountain Green Fire Protection District, both of which face expanded service areas due to rapid residential development and WUI growth. All lifelines traverse terrain that is increasingly exposed to wildfire, flood, and severe-weather impacts.

Built Environment and Structures/Land at Risk

The built environment in unincorporated Morgan County is concentrated in valley-floor neighborhoods and foothill subdivisions, with rapid growth documented in Mountain Green, Morgan Valley, and adjacent areas. County population nearly doubled between 2000 and 2020 (4,494 to 8,224 residents), increasing the number of structures exposed to wildfire, flooding, landslides, and severe winter weather. Many homes are located near steep slopes, river corridors, or canyon mouths, where hazards such as erosion, debris flows, and rising wildfire intensity pose significant risks. First Street Foundation data indicate 99% of properties have wildfire exposure and 32.2% (2,529 properties) have flood risk, illustrating the scale of hazard interaction with the built environment[166].

[166] First Street Foundation, Risk Factor Flood Model (Morgan County, Utah), 2024, https://riskfactor.com

Infrastructure and housing growth have placed additional pressure on transportation, drainage, and water systems, particularly in Mountain Green and Milton, where residents reported concerns about congested roads and limited water resources. Homes constructed on valley alluvium may be affected by expansive or collapsible soils documented in the County, which threaten foundations, pavements, and underground utilities over time. The expanding built footprint in WUI areas increases exposure not only to fire danger but also to post-fire flooding and erosion. As development continues, cumulative impacts on lifelines and land stability heighten vulnerability across the unincorporated area.

Changes Since the Last Plan Update

Since the FEMA-approved 2021 PDM Plan, several developments have increased vulnerability in unincorporated Morgan County. Updated demographic data show continued population growth in west-side communities, with 8,317 unincorporated residents in 2023 and rapid expansion in Mountain Green and Morgan Valley. This growth has added hundreds of new homes in foothill and canyon areas, increasing the number of households located in WUI zones, flood-adjacent corridors, and areas with slope instability. Public engagement for the 2022 General Plan generated 33 water-capacity concerns, 19 transportation-capacity concerns, and widespread comments opposing high-density development in risk-prone areas such as Milton, Porterville, and Richville.

Risk information has become more detailed since 2021. First Street Foundation's updated parcel-level models indicate that 99% of properties in Morgan County have some degree of modeled wildfire exposure and approximately 32.2% (2,529 properties) have modeled fluvial or pluvial flood risk. These modeled exposure estimates differ from FEMA's mapped Special Flood Hazard Areas (SFHAs), which represent regulatory floodplains used for National Flood Insurance Program (NFIP) administration. FEMA floodplain mapping identifies a smaller number of structures within the 1% and 0.2% annual chance flood zones, as described in the Flood section of this annex. The First Street data reflect broader, model-based risk screening and include localized drainage and rainfall-driven flooding that may not be captured in current FEMA mapping. Climate-risk projections also now identify a sharp increase in severe-heat days—from 7 to 16 days per year over 30 years—along with substantial smoke-related health exposure. These datasets provide parcel-level insight into hazards that were previously described only at a countywide scale.

Infrastructure and service changes also affect vulnerability. Rocky Mountain Power is upgrading the Mountain Green substation to meet rising demand, reflecting rapid growth in the western unincorporated area. Transportation challenges have intensified, with residents reporting worsening congestion and limited ingress/egress along Morgan Valley Drive, I-84 interchanges, and canyon roads. Regulatory and capability findings from the County's 2025 capability assessment confirm that zoning, subdivision standards, and floodplain regulations require modernization to reduce hazard exposure. Together, these changes indicate growing stress on land-use, infrastructure, and emergency-service systems across the unincorporated area.

Future Vulnerability Considerations

Future vulnerability in unincorporated Morgan County will be shaped by continued growth, climate change, and infrastructure limitations. Countywide population is projected to keep rising, and ongoing residential development in Mountain Green, Milton/Littleton, and Morgan Valley will place more homes and families in WUI areas, flood-adjacent corridors, and steep-slope environments. As these communities expand, additional demand on small water systems, wells, and sewer infrastructure will amplify the concerns identified in the 2022 General Plan process.

Climate trends documented in the Weber River Basin Climate Vulnerability Assessment—including long-term warming, earlier snowmelt, decreased lower-elevation snowpack, and higher evaporative demand—will continue to intensify wildfire potential, flood volatility, drought severity, and heat-related health concerns. Increased frequency of smoke events and poor air quality days will disproportionately affect children and older adults, who make up nearly 38% of the unincorporated population.

Aging infrastructure and geologic conditions will also influence long-term vulnerability. Homes built on expansive or collapsible soils may see increasing foundation and pavement damage as drought cycles, freeze–thaw events, and minor flood episodes accumulate over time. Transportation corridors—particularly I-84, canyon roads, and local collectors—will face higher stress from storm events, wildfire evacuation demands, and increasing traffic volumes. Water and power systems may become increasingly strained as demand rises and climatic conditions shift.

Capability Assessment

Unincorporated Morgan County's mitigation and resilience capabilities reflect its rural governance structure, limited regulatory toolbox, and reliance on coordination with Morgan City, special service districts, state agencies, and volunteer-based emergency services. The County manages zoning, subdivision, and development review for the unincorporated area; oversees emergency management; and maintains critical infrastructure such as roads and drainage systems, while depending on interlocal coordination and external service providers to address wildfire protection, floodplain management, and emergency response capacity in dispersed communities.

Planning and Regulatory

Table 52 summarizes planning and regulatory capabilities for this planning area.

Table 52: Unincorporated Morgan County Planning Capabilities

Plan/Document	Purpose and Relevance to Hazard Mitigation
Morgan County Pre-Disaster Mitigation Plan (2021)	Federal Emergency Management Agency (FEMA)-approved multi-jurisdictional plan that identifies key hazards such as wildfire, flood, landslide, drought, and severe winter weather; adoption enables eligibility for FEMA Hazard Mitigation Grant Program (HMGP), Building Resilient Infrastructure and Communities (BRIC), and Flood Mitigation Assistance (FMA) grants supporting mitigation across unincorporated communities.
Morgan County Local Hazard Mitigation Plan Update (in progress)	The 2025 update includes dedicated annexes for participating jurisdictions and special districts. The update process has expanded stakeholder engagement and includes enhanced hazard modeling and capability assessment findings.
Morgan County General Plan (2022 Update)	Although applicable primarily inside city boundaries, policies on transportation, stormwater, and growth influence shared access routes and infrastructure relied upon by unincorporated residents, particularly along the I-84 corridor, shared bridges, and regional utility systems serving Mountain Green and Morgan Valley.
Morgan City General Plan Update	Although applicable primarily inside city boundaries, policies on transportation, stormwater, and growth influence shared access routes and infrastructure relied upon by unincorporated residents.
Utah Enhanced State Hazard Mitigation Plan	Provides statewide hazard definitions, mitigation priorities, and funding guidance for seismic safety, wildfire risk reduction, water resilience, and post-disaster recovery. Forms the policy backbone for county-level participation in FEMA mitigation programs.
Emergency Operations Plan (County)	Coordinates response across law enforcement, emergency medical services, fire districts, public works, and the Emergency Manager. While operational in nature, it informs mitigation priorities related to evacuation, sheltering, and protection of lifelines, and supports FEMA's emphasis on linking mitigation actions to continuity of operations and post-disaster recovery planning.

Table 53 summarizes regulatory capabilities for this planning area.

Table 53: Unincorporated Morgan County Regulatory Capabilities

Policy/Code Name	Code Number (if Applicable)	Year	Purpose and Relevance to Hazard Mitigation
Morgan County Zoning Ordinance		Current	Regulates development standards, geologic hazard requirements, and hillside development. The capability assessment identifies the need for modernization to better address wildfire, flood risk, and steep-slope development.
Subdivision Ordinance		Current	Governs subdivision layout, access, drainage, and infrastructure. The County notes gaps in its effectiveness in reducing hazard exposure, particularly regarding wildfire and stormwater design.
Floodplain Ordinance		Current	Minimum National Flood Insurance Program (NFIP)-compliant ordinance; used primarily to demonstrate buildable area but currently insufficient for reducing flood risk. Enhancements are needed to address updated flood modeling.
Building Code (Adopted 2021)		2021	State-mandated building code adopted, but the County reports that current enforcement capacity does not fully reduce hazard impacts, particularly for seismic, wind, and wildfire-related construction, due to limited staffing and reliance on contracted inspection services in the unincorporated area.
Geologic Hazard Requirements		Current	Provides restrictions or additional review for development in areas with landslide, erosion, or slope hazards. No dedicated wildfire-specific development or defensible-space standards are currently codified, creating an opportunity for regulatory enhancement.

Administrative and Technical

Table 54 summarizes administrative capabilities for this planning area.

Table 54: Unincorporated Morgan County Administrative Capabilities

Agency/Organization	Sector	Role in Hazard Mitigation and Resilience
Morgan County Commission and Community Development	Governance/ Planning	Oversees zoning, subdivision, and development review; implements General Plan policies; and integrates risk data into future land-use decisions.
Morgan County Emergency Manager	Emergency Management	Coordinates hazard planning, response capabilities, training, public outreach, and Federal Emergency Management Agency (FEMA) mitigation grant participation, including coordination with Local Emergency Planning Committee (LEPC) partners and regional response agencies.
County Public Works and Roads	Infrastructure	Maintains County roads, drainage systems, snow removal, and culverts; critical for mitigation involving access/egress, stormwater, and slope stabilization.
Morgan County Fire and Mountain Green Fire Protection District	Fire/Emergency Medical Services (EMS)	Volunteer and part-time fire services covering large wildland–urban interface (WUI) areas; central to wildfire mitigation, defensible-space education, and post-fire flood risk management.
GIS Department	Technical/Data	Provides hazard mapping, parcel data, and land-use layers; supports risk assessment and development review.
Partnerships with Weber Basin Water Conservancy District, Morgan City, and State Agencies	Water/Local Government	Supports dam-safety information, drought planning, flood risk assessment, and multi-agency hazard coordination.

Table 55 summarizes technical capabilities for this planning area.

Table 55: Unincorporated Morgan County Technical Capabilities

Capability	Role in Hazard Mitigation and Resilience
Geographic information system (GIS) and hazard-data access	County GIS supports mapping of wildfire, flood, landslide, and seismic hazards for land-use review and project planning.
Engineering and planning staff	Provide development review, geologic hazard evaluation, building code enforcement, and drainage problem-solving.
Grant-writing capacity (limited)	County has applied for Building Resilient Infrastructure and Communities (BRIC) funding previously but reported constraints in staffing and capacity for complex applications. In 2025, the County hired a dedicated grant-writing staff member to support all departments, improving capacity to pursue Federal Emergency Management (FEMA), state, and infrastructure resilience funding.
Emergency services training	Fire and Emergency Medical Services (EMS) agencies maintain basic wildfire, structure-fire, and emergency medical training; would benefit from expanded wildland–urban interface (WUI) and evacuation training.
Public communication systems	Website, public meetings, and social-media channels are used, but the County reports a need for more structured, recurring hazard-education programs, particularly for wildfire evacuation, flood risk, and winter-storm preparedness in unincorporated communities.

Financial

Table 56 summarizes financial capabilities for this planning area.

Table 56: Unincorporated Morgan County Financial Capabilities[167]

Funding Source	Type	Purpose and Relevance to Hazard Mitigation
General Fund and Capital Improvement Program	Pre-Disaster	Funds routine infrastructure upgrades, culvert replacements, slope stabilization, and facility improvements—many of which can include hazard-mitigation components.
Impact Fees and Utility Fees	Pre-Disaster	Used for water, sewer, and transportation improvements; relevant for addressing capacity constraints in growth areas.
FEMA Mitigation Programs (HMGP, FMA)	Pre-/Post-Disaster	County is eligible through its adopted HMP. Previous BRIC submissions indicate growing capacity to pursue mitigation funding.
CDBG and NRCS/ USACE Programs	Pre-/Post-Disaster	Underutilized funding sources identified in the capability assessment; could support drainage improvements, fire-fuel reduction, or slope-stability projects.
Public Assistance (406 Mitigation)	Post-Disaster	Available following federally declared incidents for resilient rebuilding of damaged infrastructure.

Education and Awareness

Table 57 summarizes education and awareness capabilities for this planning area.

Table 57: Unincorporated Morgan County Education and Awareness Capabilities

Capability	Lead Organization	Description
Public safety and emergency preparedness messaging	Morgan County Emergency Management	Provides hazard information through online channels, community meetings, and seasonal announcements; would benefit from expanded outreach.
Fire-prevention and WUI education	Morgan County Fire/Mountain Green Fire Protection District	Morgan County Fire and Mountain Green Fire Protection District offer outreach on defensible space, wildfire prevention, and burn permits; limited by volunteer capacity. These agencies actively utilize social media

[167] FEMA: Federal Emergency Management Agency, HMGP: Hazard Mitigation Grant Program, FMA: Flood Mitigation Assistance, HMP: Hazard Mitigation Plan, BRIC: Building Resilient Infrastructure and Communities, CDBG: Community Development Block Grant, NRCS: Natural Resources Conservation Service, USACE: U.S. Army Corps of Engineers.

Capability	Lead Organization	Description
		platforms, including Facebook and Instagram, to share fire-prevention messaging and emergency information.
Land-use and development review education	Community Development	Communicates requirements related to geologic hazards, subdivision standards, and site review; integrates hazard-mapping resources into project review.
Coordination with regional agencies	Morgan County, Weber Basin Water Conservancy District	Shares flood, drought, and dam safety information with residents and developers.

National Flood Insurance Program Status

Table 58 summarizes National Flood Insurance Program (NFIP) status for this planning area.

Table 58: Unincorporated Morgan County NFIP Status[168]

CID	Community Name	County	Initial FHBM Identified	Initial FIRM Identified	Current Effective Map Date	Regular–Emergency Program Entry Date
490092B	Morgan County (unincorporated areas)	Morgan County	10/18/1974	09/28/1990	12/07/2017	09/28/1990

- **Flood Zones:** Unincorporated Morgan County participates in the NFIP and has mapped SFHAs along the Weber River, East Canyon Creek, and their associated tributaries, based on the most recent FEMA Flood Insurance Rate Maps (FIRMs) that became effective December 7, 2017[169]. Risk assessments indicate that 2,529 properties (32.2%) countywide have some degree of flood exposure, highlighting the importance of the NFIP in supporting flood-resilient development.
- **Floodplain Management Regulations and Compliance:** Morgan County administers a Flood Damage Prevention Ordinance and reviews all development proposed within mapped floodplains. The 2025 capability assessment notes that the existing ordinance is NFIP-compliant but is primarily used to identify buildable areas rather than fully reducing flood risk, indicating a need for updated standards and enforcement capacity. County planning, engineering, and building staff implement NFIP provisions and coordinate with landowners and developers to ensure compliance.
- **Adoption of NFIP Criteria:** As an NFIP-participating jurisdiction, Morgan County enforces minimum federal floodplain standards, including elevation, design, and construction requirements for structures

[168] CID: Community Identification Number, FHBM: Flood Hazard Boundary Map, FIRM: Flood Insurance Rate Map, NFIP: National Flood Insurance Program.
[169] Federal Emergency Management Agency (FEMA), Flood Insurance Rate Map, Morgan County, Utah (CID 490092B), Effective December 7, 2017, https://msc.fema.gov.

built or substantially improved in SFHAs. These requirements apply to residential, commercial, and agricultural development within the unincorporated area.

- **Implementation Oversight:** NFIP implementation is carried out by Morgan County's floodplain administrator—identified in the capability assessment as part of the Planning and Community Development team—who coordinates with engineering and building officials on permit reviews. Oversight includes reviewing elevation certificates, enforcing development standards, and ensuring post-disaster compliance when flood-related damage occurs.
- **Substantial Improvement/Substantial Damage (SI/SD) Provisions:** SI/SD determinations for structures in unincorporated Morgan County are made by Morgan County's Planning Department as part of its NFIP regulatory responsibilities. Structures meeting SI/SD thresholds must be brought into compliance with current NFIP standards, including elevation or floodproofing as applicable. The capability assessment indicates that enhanced training and staff capacity would improve implementation.
- **Repetitive Loss (RL) and Severe Repetitive Loss (SRL) Properties:** As of the most recent statewide NFIP review, Morgan County has two Repetitive Loss (RL) properties. Based on available NFIP documentation, both properties are classified as residential structures. Neither is identified as a public facility or critical infrastructure asset within the unincorporated area. No Severe Repetitive Loss (SRL) properties have been identified in reviewed NFIP records.
- **Community Rating System (CRS) Participation:** Morgan County is not currently a CRS-participating community, meaning residents and property owners do not receive CRS-related NFIP premium discounts. Future participation could yield insurance savings and support mitigation projects through CRS credit activities.
- **Regional Coordination:** The County benefits from regional flood-mapping and watershed initiatives led by FEMA and the Weber Basin Water Conservancy District. Updated watershed-scale maps for the Weber River, East Canyon Creek, and Cottonwood Creek—funded and prepared in previous FEMA mapping cycles—inform local regulatory reviews and hazard mitigation strategies.

Opportunities for Improvement

Table 59 identifies opportunities for improvement for this planning area.

Table 59: Unincorporated Morgan County Opportunities for Improvement

Opportunity Type	Description	Lead Organization
Planning and Regulatory	Update and expand the County's floodplain ordinance to better reflect new modeling and to strengthen standards for development in riverine and alluvial-fan areas; incorporate updated flood data into subdivision and site-review requirements. Develop a Community Wildfire Protection Plan (CWPP) to strengthen wildfire mitigation and land-use coordination in WUI areas.	Morgan County Community Development and Floodplain Administrator
Administrative and Technical	Improve NFIP administration capacity by providing staff training on SI/SD determinations, elevation certificate review, and FEMA floodplain standards; strengthen documentation and compliance processes.	Morgan County Planning, Engineering, and Building Departments
Financial	Pursue FEMA Hazard Mitigation Assistance (FMA, HMGP) to fund culvert upgrades, channel improvements, or buyouts/elevations in RL areas; leverage underused funding sources identified in the capability assessment.	Morgan County Emergency Management and Community Development
Education and Awareness	Expand outreach to property owners in SFHAs regarding flood insurance requirements, mitigation options, and evacuation planning; provide updated FIRM maps and risk information through the County website and public workshops.	Morgan County Emergency Management
NFIP	Establish a requirement within County development-review procedures to consult updated FIRMs prior to issuing permits in or near the Weber River and creek corridors; improve coordination between planning, engineering, and fire districts during site review.	Morgan County Floodplain Administrator, Planning and Engineering

Mitigation Strategy

Status of Prior Actions

Table 60 summarizes the status of prior mitigation actions for this planning area.

Table 60: Unincorporated Morgan County Mitigation Actions Status Updates

Hazard	Mitigation Action Item	Current Status
Avalanche	Increase knowledge among city and County Emergency Managers.	In process. Part of day-to-day operations.
Avalanche	Purchase avalanche-risk-area lands or require buffers when developing infrastructure such as roads or buildings.	In process.
Avalanche	Plant trees and other vegetation to reduce impact the of avalanches.	In process.
Avalanche	Develop an avalanche code or regulation prohibiting or limiting structures in known avalanche zones.	In process.
Dam Failure	Work with the Utah Division of Water Rights and dam companies to bring deficient high-hazard dams up to current industry standards.	Completed.
Dam Failure	Work with the Utah Division of Water Rights and dam companies to update dam emergency action plans.	In process
Dam Failure	Work with the Utah Division of Water Rights and dam companies to install a dam-monitoring system.	Dam monitoring system is in place through DOR. Additionally, the County coordinates with Weber Basin.
Dam Failure	Relocate government-owned facilities located near high-risk dam failures.	No current government buildings are near high-risk dams, county building and fire department are inside the floodplain though.
Dam Failure	Develop ordinances to prohibit or limit critical facilities and/or structures in dam inundation areas.	In process.
Drought	Update and adopt drought ordinances.	Plans to do so within the next year.
Drought	Enforce codes, ordinances, statutes, and laws that promote drought resiliency and water conservation practices.	In process. Code Enforcement is actively enforcing current codes related to this.

Hazard	Mitigation Action Item	Current Status
Drought	Educate residents on water-saving techniques.	Ongoing. Flyers and social media posts sent out annually.
Drought	Educate the agricultural sector on soil and water-saving practices.	In Process. Plan in process to provide this education.
Drought	Educate decision-makers and government employees on water-saving techniques.	Completed once in the last 5 years. Plans in place to make this an annual training.
Drought	Retrofit water-supply systems to handle current and new growth.	Plans in place, implementation to proceed within the next 1-2 years.
Drought	Expand and improve existing potable-water systems.	No progress since 2021.
Drought	Designate and/or preserve adequate source-water protection zones or groundwater-recharge areas.	No progress on this action.
Earthquakes	Conduct building safety inspections.	Done. Plans in place to make this an ongoing process.
Earthquakes	Conduct outreach to builders, architects, engineers, and inspectors.	In process.
Earthquakes	Establish a "green infrastructure" program to link, manage, and expand existing parks, preserves, and greenways.	No progress yet.
Earthquakes	Develop and/or review or adopt a model earthquake hazard ordinance.	No progress yet.
Earthquakes	Building code adoption and enforcement.	In process.
Earthquakes	Local planning such as critical facilities planning, financial incentives, creating a safety committee, emergency planning, etc.	Emergency planning ongoing. Plans to create a safety committee and identify financial incentives.
Earthquakes	Retrofit critical facilities and infrastructure to withstand earthquakes.	No progress.
Earthquakes	Retrofit or rebuild County/ essential buildings and infrastructure to help reduce any potential risk of an earthquake severely incapacitating emergency response and/or access into/outside/within the County. This applies to earthquakes, but also can be beneficial in the event of a different natural disaster or domestic terrorism threat. This should be a standard practice and would be for the immediate benefit of Morgan County	No progress. Elected officials are aware of the need to retrofit/replace the Morgan County Fire Station and County Building, plans to do so within the next 5 years. Funding sources are being sought to assist with this.

Hazard	Mitigation Action Item	Current Status
	and its residents, tourists, and other customers.	
Flood	Foster coordination and partnerships (e.g., develop stormwater committee, regional watershed council, local councils, etc.)	Regional watershed council in place. Plans to develop a stormwater committee.
Flood	Conduct stormwater management planning.	In progress.
Flood	Elevate or retrofit facilities and infrastructure.	No progress.
Flood	Protect infrastructure such as roads, bridges, wastewater treatment, etc.	Several culverts have been placed/replaced/retrofitted to improve drainage and protect infrastructure. More work to be done.
Flood	Improve stormwater drainage capacity.	Some improvements have been made in the Highlands in Mtn Green as well as along Morgan Valley Drive. More improvements needed.
Flood	Conduct regular maintenance for drainage systems and flood control measures.	In Process. Currently part of day-to-day operations.
Flood	Protect and restore natural flood mitigation features through natural greenway protection and restoration.	No progress yet
Flood	Review and/or develop codes, ordinances, and policies.	Review of current codes/ordinances completed with goal of annual or every other year reviews going forward.
Flood	Adopt and enforce building codes and development standards.	Codes have been adopted. Plans to enforce them are in process.
Flood	Preserve floodplains and open space through ordinances, land purchase, conservation easements, etc.	Limited progress made, more needed.
Landslides	Implement monitoring mechanisms/procedures (i.e., visual inspection or electronic monitoring systems).	Plans to implement of schedule for visual monitoring; not yet completed.
Landslides	Install catch-fall nets for rocks at steep slopes near roadways.	No progress.
Landslides	Use debris-flow measures that may reduce damage in sloping areas such as stabilization, energy dissipation, and flow-control measures.	No progress

Hazard	Mitigation Action Item	Current Status
Landslides	Locate and/or relocate utilities outside of landslide areas to decrease the risk of service disruption.	In progress.
Landslides	Retrofit power, water, and sewer infrastructure.	Some progress made. Power retrofit done 2022, water and sewer ongoing.
Problem Soils	Develop a code or regulation prohibiting or limiting structures in known problem-soil areas.	No progress.
Problem Soils	Require geotechnical study to determine risk to structures in various geographic areas.	Not yet required but suggested. Plan to move towards making this a requirement throughout the next few years.
Problem Soils	Restrict development in areas with soil that is considered poor or unsuitable for development.	No progress.
Problem Soils	Retrofit or remove existing structures from problem-soil areas.	No progress.
Radon	Review and/or develop codes, ordinances, and policies.	No progress.
Radon	Require testing at existing facilities and homes during and/or immediately after construction.	In progress. Ongoing efforts.
Radon	Develop radon-prevention standards and regulations for new housing, including installation of ventilation systems in high-hazard areas.	In progress. Ongoing efforts.
Radon	Encourage homeowners to test for radon.	In progress. This is done through annual flyers and social media messaging.
Radon	Encourage homeowners to install radon systems in their homes.	In progress. Ongoing efforts.
Severe Weather	Provide weather-related information through print, broadcast, and social media.	Morgan City has a text alert system in place currently which is utilized to update residents. The county utilized Everbridge for serious alerting needs. Information is also posted to County social media sites.
Severe Weather	Retrofit public buildings and critical facilities/ infrastructure.	Not yet started. Remodel of County Library scheduled to be completed

Hazard	Mitigation Action Item	Current Status
		this spring to strengthen it to withstand severe weather better.
Severe Weather	Ensure all essential infrastructure buildings (police, fire, utilities, etc.) serve as prime examples in the County and the state for disaster mitigation best practices and function not only as disaster-resistant structures, but also as places for the community to see how best practices can enhance public services.	Plans in place to do so, no progress currently made. Outside funding sources are being researched to make these repairs, confirm technical feasibility, etc.
Severe Weather	Use natural environmental features as wind buffers in site design.	In progress.
Tornadoes	Require wind-resistant building techniques.	Remove from plan. Tornadoes have not been an issue in Morgan County due to the surrounding mountains.
Tornadoes	Develop infrastructure improvements to reduce risks from sustained wind events. Tornadoes are unlikely in this valley, but downslope winds are more realistic, so it would be helpful to have essential infrastructure in place to reduce accessibility problems should another event occur.	In progress.
Wildfire	Develop wildfire and/or wildland–urban interface (WUI) codes or regulations prohibiting or limiting structures in known wildfire-risk areas.	Current regulations in place with better ones currently being worked on that specifically take into account State guidance from HB 48.
Wildfire	Ensure newly constructed government-owned facilities are code-compliant for wildfire hazards, and promote the use of enhanced wildfire mitigation practices.	No government owned facilities have been built in WUI land in the last 5 years. Any buildings in these areas going forward will be code compliant with enhanced wildfire mitigation practices.
Wildfire	Develop a community wildfire preparedness plan.	In process.
Wildfire	Include consideration of wildfire hazards in land-use, public-safety, and other processes.	In process. Part of day-to-day operations.
Wildfire	Use zoning and/or a special wildfire overlay district to designate high-risk areas and specify the conditions for the use and development of specific areas.	Currently ongoing with hopes of the newest regulations being approved by resolution by the Commission within the next month.

Hazard	Mitigation Action Item	Current Status
Wildfire	Promote conservation of open space or wildland–urban boundary zones to separate developed areas from high-hazard areas.	In progress. Identifying opportunities to implement this.
Wildfire	Participate in the Firewise Program.	In progress. Ongoing activity as the County currently participates.
Wildfire	Mitigate against post-wildfire flooding via structural projects in drainage areas.	No progress yet, plans are in place once funding becomes available.
Wildfire	Implement a fuels-management program.	In process with a 2026 estimated timeline.
Wildfire	Mandate that wildfire planning be incorporated into development and land-use planning.	In process for implementation spring 2026.
Wildfire	Address density and quantity of development as well as emergency access, landscaping, and water supply.	Current regulations in place with better ones currently being worked on that specifically take into account State guidance from HB 48.
Wildfire	Educate property owners about wildfire-mitigation techniques.	No government owned facilities have been built in WUI land in the last 5 years. Any buildings in these areas going forward will be code compliant with enhanced wildfire mitigation practices.
Wildfire	Establish structural and defensible space requirements.	In process.

2026 Mitigation Actions

Table 61 summarizes 2026 mitigation actions for this planning area. The table includes both new mitigation actions and priority actions carried forward from the 2021 HMP that remain incomplete or require continued implementation.

Table 61: 2026 Mitigation Actions for Unincorporated Morgan County[170]

Action Number	Action Title	Description	Hazard Addressed	Vulnerability	Goals	Lead Agency	Funding Source	Timeline	Priority	In 2021 HMP?
UMC-1	**Multi-Hazard Community Risk Assessments (Annual Program)**	Conduct annual assessments of hazards affecting housing, roads, utilities, and WUI areas; integrate findings into capital planning and development review.	All Hazards	Supports compliance and long-term planning.	Inform ongoing mitigation.	EM; Community Development	Local funds	Annual	**Medium**	Yes
UMC-2	**Evacuation Communication Plan Development**	Develop a communication plan to notify residents when and how to evacuate in the event of a dam failure, and test it in collaboration with state, federal, and private partners.	Dam Failure	Dam failures are rare but could have a large impact on Morgan County residents.	Improve communication planning with partners and the public.	EM	HHPD funds; local funds	2–4 years	**Medium**	Yes

[170] EM: Emergency Management; EPA: Environmental Protection Agency; FFSL: Utah Division of Forestry, Fire & State Lands; FMA: Flood Mitigation Assistance; GIS: Geographic Information System; GP: General Plan; HHPD: High Hazard Potential Dam Program; HMGP: Hazard Mitigation Grant Program; SSD: Special Service District; UDOT: Utah Department of Transportation; WUI: Wildland–Urban Interface.

Action Number	Action Title	Description	Hazard Addressed	Vulnerability	Goals	Lead Agency	Funding Source	Timeline	Priority	In 2021 HMP?
UMC-3	**Drought and Water System Resilience Program**	Support private water companies, SSDs, and Morgan County in evaluating drought vulnerabilities; upgrade wells, storage, and interconnections where feasible.	Drought	The County received 33 GP comments noting limited water capacity and rising demand in west-County areas.	Ensure long-term water reliability.	County EM; Water Providers	State water grants	2–6 yrs	**Medium-High**	Yes
UMC-4	**Backup Power for Community Critical Facilities**	Install generators or battery storage at critical infrastructure (fire stations, County offices, library, water system facilities) to maintain continuity during outages.	Earthquake, Extreme Cold, Snowstorm	Winter storms cause outages; residents rely on essential facilities for heating and communications.	Maintain essential services.	Emergency Management	HMGP; capital funds	2–4 yrs	**Medium**	Yes
UMC-5	**Critical Facility Seismic Retrofit Assessment**	Conduct structural vulnerability assessments of County-owned critical facilities (Fire Station, County Building, Library) and develop phased retrofit or replacement plan.	Earthquake	Older facilities and pre-1987 buildings are vulnerable to strong ground shaking.	Maintain emergency response continuity after major seismic event.	County Commission; Public Works	HMGP; Capital funds	2–5 years	**High**	Yes
UMC-6	**Steep-Slope and Landslide Hazard**	Update geologic hazard maps using state data; incorporate	Erosion, Landslide	Steep terrain with unconsolidated soils; risk	Avoid placing new	Community Development; GIS	HMGP; State Geologic Hazards Fund	1–3 yrs	**Medium-High**	Yes

Action Number	Action Title	Description	Hazard Addressed	Vulnerability	Goals	Lead Agency	Funding Source	Timeline	Priority	In 2021 HMP?
	Mapping and Development Controls	constraints into subdivision review and permit processes for Mountain Green and Highland areas.		increases post-wildfire.	development in unstable areas.					
UMC-7	**Flood Mitigation and Drainage Upgrades for High-Risk Corridors**	Assess and upgrade culverts, storm drains, and roadside ditches to reduce pluvial and riverine flooding.	Flood, Erosion	About a third (32.2%) of County properties are at risk from flooding, and public concern about drainage was documented in 2022 GP engagement.	Reduce road closures; prevent property damage.	County Roads; Engineering	FMA; HMGP; capital funds	2–5 yrs	**High**	Yes
UMC-8	**Floodplain Ordinance Modernization**	Update the Flood Damage Prevention Ordinance to incorporate updated modeling, higher standards where feasible, and improved enforcement procedures.	Flood	Existing ordinance is NFIP-compliant but primarily identifies buildable area rather than reducing risk.	Reduce future flood exposure and strengthen NFIP implementatio n.	Community Development; Floodplain Administrator	Local funds; FMA	1–3 years	**High**	Yes
UMC-9	**Structural Reinforcement of Emergency Vehicles and Facilities**	Reinforce roofs and windows of critical vehicles and facilities to withstand impacts from hailstorms and	Hail, High Wind	Most of Morgan County is vulnerable to hail greater than 2 inches in diameter	Reduce property damage and maintain emergency	EM; Police; Fire Department	HMGP; local funds	2–6 years	**Medium**	No

Action Number	Action Title	Description	Hazard Addressed	Vulnerability	Goals	Lead Agency	Funding Source	Timeline	Priority	In 2021 HMP?
		high wind. This may include reinforced glass, stronger roofing materials, and proper sealing and maintenance of existing structures.		and winds over 100 mph.	services during storms.					
UMC-10	**Updated Mapping of Problem Soils**	Create and maintain updated mapping of expansive soils, collapsible soils, and subsidence-prone areas across the County	Problem Soils	Problem soils, particularly expansive soils, exist throughout the County.	Improve knowledge of problem soils that could disrupt buildings or roads.	Public Works	HMGP; local funds	2–4 years	**Medium**	No
UMC-11	**Countywide Radon Outreach and Testing Program**	Provide radon testing kits, community workshops, and mitigation guidance in areas with elevated radon potential.	Radon	The County is in EPA Zone 2, and many older homes have elevated basements that increase radon exposure risk.	Reduce long-term cancer risk.	County Health; EM	EPA radon grants	1–3 yrs	**Medium**	No
UMC-12	**Updated Countywide Wildfire and WUI Development Standards**	Develop and adopt WUI-specific subdivision, access, landscaping, and construction standards for high-risk areas (e.g., Mountain Green,	Wildfire	Nearly all properties (99%) have wildfire exposure, and steep slopes and single-access	Reduce ignition pathways; improve evacuation safety.	Community Development; County Fire	Utah FFSL grants	1–3 yrs	**High**	No

Action Number	Action Title	Description	Hazard Addressed	Vulnerability	Goals	Lead Agency	Funding Source	Timeline	Priority	In 2021 HMP?
		Milton/Littleton, Porterville), incorporating defensible space, roadway width, and fire-resistant materials.		subdivisions increase risk.						
UMC-13	**Wildfire Fuel Reduction and Post-Fire Flood Mitigation in Priority Drainages**	Conduct fuel reduction treatments (thinning, mastication, prescribed fire) in high-risk drainages; implement post-fire flood mitigation where needed (e.g., debris basins, channel armoring).	Wildfire, Flood	Steep drainages above Mountain Green, Peterson, and Croydon are prone to post-fire debris flows.	Reduce burn-severity risk and mitigate post-fire debris flows affecting downstream homes.	County Fire; EM	Utah FFSL; HMGP	1–5 yrs	**Medium**	No
UMC-14	**Community Wildfire Protection Plan (CWPP) Completion and Implementation**	Finalize and implement a Countywide CWPP addressing defensible space, fuels reduction, evacuation planning, and development standards in WUI areas.	Wildfire	Rapid growth in Mountain Green and west-side WUI areas increases structure exposure and evacuation constraints.	Reduce structure ignition risk and improve coordinated wildfire response.	EM; Fire Districts; Community Development	HMGP; State FFSL grants	1–3 years	**High**	Yes

Action Number	Action Title	Description	Hazard Addressed	Vulnerability	Goals	Lead Agency	Funding Source	Timeline	Priority	In 2021 HMP?
UMC-15	**Development of an Evacuation Communication Plan**	Develop and test a countywide evacuation communication plan for dam failure and other fast-onset hazards, coordinating with state, federal, and private dam owners; integrate GIS-based alert zones and notification methods.	Dam Failure	Dam failures are rare but could have catastrophic downstream impacts, particularly in Mountain Green, Croydon, and canyon corridors.	Improve public warning, evacuation timing, and interagency coordination.	Emergency Management	HMGP; local funds	2–4 yrs	**Medium**	No
UMC-16	**Dam Failure Inundation Mapping and Emergency Action Coordination**	Coordinate with Utah Division of Water Resources and dam owners to update or refine dam inundation mapping for unincorporated areas; integrate results into emergency planning, land-use review, and public awareness materials.	Dam Failure	There is limited public understanding of inundation areas and the extent downstream exposure.	Reduce life-safety risk and improve preparedness.	Emergency Management; Community Development	HMGP; state dam safety funds	2–5 yrs	**Medium**	No
UMC-17	**Countywide Problem Soils Mapping and Development Guidance**	Develop and maintain a countywide GIS map identifying expansive soils, collapsible soils, subsidence risk, and shallow groundwater	Problem Soils	Expansive and collapsible soils threaten roads, foundations, and utilities.	Improve siting decisions and reduce infrastructure damage.	Public Works; Community Development	HMGP; local funds	2–4 yrs	**Medium**	No

Action Number	Action Title	Description	Hazard Addressed	Vulnerability	Goals	Lead Agency	Funding Source	Timeline	Priority	In 2021 HMP?
		areas; integrate findings into development review and capital planning.								
UMC-18	**Avalanche Hazard Awareness and Transportation Coordination Program**	Coordinate with UDOT, recreation partners, and emergency responders to improve avalanche awareness, signage, seasonal road management, and response planning in canyon corridors (East Canyon, Lost Creek, Upper Weber Canyon).	Avalanche	Recreationists and canyon transportation routes are exposed to significant avalanche hazards during winter conditions.	Reduce injuries, fatalities, and access disruptions.	Emergency Management; County Roads	State transportation; local funds	1–3 yrs	**Low–Medium**	No

Mitigation Actions Implementation and Monitoring

Unincorporated Morgan County will implement and track mitigation actions through coordination among Morgan County Emergency Management, Community Development, County Roads and Engineering, and relevant special service districts. The Emergency Manager will maintain a mitigation-action tracking sheet that documents the following:

- Annual progress and measurable milestones
- Engineering studies completed
- Grants submitted (HMGP, FMA, FFSL, etc.)
- Design and construction phases
- Integration with capital-improvement planning

Progress will be reviewed internally each year, with updates provided to the Morgan County Commission and incorporated into countywide HMP monitoring requirements. The County will also coordinate with Morgan City, Mountain Green Special Service Districts (SSDs), Weber Basin Water Conservancy District, and state agencies to ensure alignment across jurisdictions, particularly for projects affecting shared evacuation routes, water systems, or flood corridors.

Plan Integration

Status of Prior Plan Integration

The 2021 Morgan County PDM Plan did not include a separate annex or jurisdiction-specific mitigation actions for unincorporated Morgan County. Instead, the 2021 plan presented mitigation actions at a countywide level, without distinguishing between incorporated municipalities and unincorporated communities. Unincorporated areas—including Mountain Green, Milton/Littleton, Porterville, Peterson, Richville, and other valley and foothill communities—were referenced primarily within hazard profiles and general facility inventories, but no formal linkage to unincorporated-area land-use policies, subdivision review processes, capital-improvement planning, or infrastructure investment decisions was documented.

Similarly, the 2021 PDM Plan did not formally integrate hazard-mitigation goals with the 2022 Morgan County General Plan, despite significant public concern raised during the General Plan process. The County's 2025 capability assessment further identified gaps in regulatory integration, including outdated floodplain and subdivision standards, limited wildfire-specific development requirements, and insufficient capacity to consistently incorporate hazard data into land-use and development decisions.

As a result, no evidence of a structured or formalized plan-integration framework was identified between the 2021 PDM Plan and other County planning, capital, or operational documents applicable to unincorporated Morgan County.

Future Plan Integration Methodology

Unincorporated Morgan County will use this annex to formally integrate hazard mitigation into County planning, land-use decision-making, and infrastructure development. Integration will occur through the following mechanisms:

- **Alignment with Land-Use and Development Review Processes:** The Community Development Department will incorporate hazard-layer review—including wildfire exposure (99% of properties), flood risk (2,529 properties), landslide susceptibility, and steep-slope constraints—into zoning, subdivision, and site-plan reviews. This will improve alignment between mitigation priorities and growth management policies identified in the 2022 General Plan.
- **Integration with Capital Improvement Planning (CIP):** County CIP processes will incorporate mitigation needs such as drainage upgrades, culvert replacement, steep-slope stabilization, road/egress improvements, and critical-facility backup power. Prioritization will be informed by updated flood and wildfire data, the new hazard ranking, and community-identified infrastructure concerns.
- **Coordination with Emergency Response and Operational Plans:** The Emergency Operations Plan and departmental response procedures will integrate hazard-specific findings—such as evacuation constraints in Mountain Green, canyon-route vulnerabilities, and post-wildfire flood risks. Annual emergency-management training and coordination meetings will ensure alignment across law enforcement, fire, EMS, roads, and water providers.
- **Incorporation into Budgeting and Grant Development:** The County will evaluate opportunities to align local funds with FEMA Hazard Mitigation Assistance (HMGP, BRIC, FMA), Utah forestry and watershed grants, and other state and federal resources. Identification of at least one shovel-ready mitigation project has been identified as a key priority in the capability assessment.
- **Cross-Jurisdictional Coordination:** Morgan County will coordinate with Morgan City, Weber Basin Water Conservancy District, Mountain Green SSDs, and federal/state partners to ensure consistency among infrastructure decisions, floodplain regulations, WUI standards, and watershed projects across shared service areas and hazard zones.
- **Staff Development and Hazard-Specific Training:** Training will include NFIP requirements, SI/SD determinations, wildfire/WUI development standards, geologic hazard review, and post-fire flood/erosion management. Capability assessments show that additional staff training will improve plan implementation.

Plan Maintenance

Morgan County will maintain this annex and the associated mitigation-action tracking framework through coordinated responsibility among Emergency Management, Community Development, County Roads and Engineering, and participating special service districts. The Emergency Manager will be responsible for ensuring that mitigation actions, capability updates, and hazard data are reviewed regularly and that

relevant changes are incorporated into County planning and operational documents. Administrative maintenance will include documenting completed actions, updating responsible parties as staffing or organizational roles change, and ensuring continued eligibility for FEMA mitigation funding through plan adoption and implementation.

Continued Public Involvement

Morgan County will maintain multiple opportunities for resident involvement throughout the mitigation-planning cycle. Public engagement will include the following:

- Posting plan updates, action progress, and annual review summaries on the County website
- Sharing relevant mitigation information through public meetings, Commission agendas, and community newsletters
- Making draft updates available for public comment before the next LHMP revision
- Inviting residents—particularly those in high-growth or high-risk areas (Mountain Green, Milton, Porterville, canyon corridors)—to participate in surveys and workshops on wildfire, flood, drought, and evacuation issues
- Incorporating feedback from General Plan engagement processes into ongoing hazard-mitigation reviews

These practices reflect documented public interest in water supply, transportation capacity, and development in hazard-prone areas.

Monitoring, Evaluating, and Updating the Plan

Morgan County Emergency Management will convene at least one annual review of mitigation action progress, which will document the following:

- Action status (completed, in progress, delayed, not started)
- Changes in hazard conditions (e.g., updated FEMA maps, new climate data, wildfire events)
- Changes in population or development patterns that increase vulnerability
- New capability-assessment findings
- Opportunities for grant applications or partnership projects
- Recommended updates to development standards or CIP priorities

A full annex update will occur during the next five-year LHMP update cycle, consistent with FEMA requirements. Early updates may occur if hazard conditions change significantly—such as major flooding, a damaging wildfire, adoption of new FEMA FIRMs, or substantial changes in development patterns or County governance.

Morgan City Annex

Introduction

Morgan City is the largest city in the County, with a current population of 4,652,[171] representing an increase of approximately 14.3% since the 2020 Census decennial population count of 4,071 people.[172] Located in a valley with steep slopes rising to the north and east of the City, the terrain transitions from a high point of nearly 6,400 feet in the foothills of Durst Mountain that border the north end of the City, to approximately 5,200 feet at the base of the foothills[173]. The land then slopes gently toward the Weber River and East Canyon Creek, where elevations approach 5,060 feet. The majority of the City is relatively flat or gently sloping, containing views of the surrounding mountains, while the slopes in the foothills exceed 30% in most areas, which is considered undevelopable (see Figure 73).

	MORGAN CITY	MORGAN COUNTY	STATE OF UTAH
Average Annual Growth	1.00%	2.65%	1.66%
Total Increase	384	2,826	496,284
% of Increase	13.59% (of County)	0.6% (of State)	

Source: U.S. Census Population Estimates

Figure 73: Morgan City Population Statistics 2010–2020[174]

The abundant natural resources that help establish the unique character of the City also require careful planning to ensure the integrity of those features is maintained, and to avoid problems with future development. Maintaining the community character of Morgan is one of the top priorities for City and County residents, and the preservation of agricultural lands and natural open space is key to achieving

[171] Worldpopulationreview.com, "Morgan City Utah," 2025, https://worldpopulationreview.com/us-cities/utah/morgan.
[172] U.S. Census Bureau, "Morgan City, Utah," 2025, https://data.census.gov/profile/Morgan_city,_Utah?g=160XX00US4951910.
[173] U.S. Geological Survey (USGS), National Elevation Dataset (NED), Morgan City Quadrangle, 2023, https://www.usgs.gov/core-science-systems/ngp/3dep)
[174] Morganutah.gov, "Morgan City General Plan 2024," 2024, https://www.morganutah.gov/planning.

this goal. Public feedback from the 2024 General Plan survey of Morgan City residents indicated a need to work with the community to develop more respectful riparian land-use policies, use agriculture to help reduce wildfire hazards in open spaces, maintain the Greenbelt designation, and update water and wastewater systems to accommodate growth and development.[175]

Critical Infrastructure and Key Resources

Morgan City's critical infrastructure and key community resources include facilities and systems that support safety, emergency response, and continuity of essential services. Key categories include: (1) transportation corridors and crossings that provide community access and emergency response routes; (2) water, wastewater, and stormwater infrastructure that support public health and flood risk reduction; (3) power and communications systems necessary for emergency communications and continuity of operations; and (4) public facilities that support administration, emergency coordination, and community services.

These assets may be impacted directly by hazard events (e.g., physical damage, service disruption) and indirectly through access constraints, cascading utility failures, or extended recovery timelines. Morgan City will coordinate with asset owners and internal departments to document critical assets, identify hazard-related vulnerabilities, and prioritize feasible mitigation measures through annual plan maintenance and capital improvement planning.

Hazard Identification

Flood, wildfire, and earthquake hazards were found to present the highest risks to human life in Morgan City. Other risks, such as erosion and problem soils, present long-term risks to water quality and agricultural interests. Table 62 identifies the natural hazards evaluated for this planning area and indicates which hazards are applicable based on local conditions and available data.

Table 62: Hazards Identified and Exceptions for Morgan City

Hazard	Applicable	Not Applicable	Rationale for Not Including
Avalanche	X		
Dam Failure	X		
Drought	X		
Earthquake	X		
Erosion	X		

[175] Morganutah.gov, "Morgan City General Plan 2024," 2024, https://www.morganutah.gov/planning.

Hazard	Applicable	Not Applicable	Rationale for Not Including
Extreme Cold	X		
Flood	X		
Hail	X		
High Wind	X		
Landslides	X		
Problem Soils	X		
Radon	X		
Snowstorms	X		
Wildfire	X		

Vulnerability Analysis

Overall Vulnerability and Impact Summary

Vulnerability analysis in a hazard mitigation plan identifies community assets that are at risk from identified hazards. Assets can be people, structures, critical facilities and infrastructure, systems, the economy, valued activities, and natural, historic, and cultural resources, so it is important to understand how these assets can be impacted by identified hazards to support the development of mitigation actions to address those hazards.

For Morgan City, the highest-priority life-safety hazards are earthquakes (Calculated Priority Risk Index [CPRI] 3.25), radon (3.25), snowstorms (3.0), drought and problem soils (2.95), wildfire (2.9), and flood (2.75), followed by extreme cold, high wind, erosion, dam failure, landslide, avalanche, and hail. These hazards threaten city employees, residents, businesses, schools, critical facilities, and supporting lifelines (power, water, sewer, transportation, communications).

AVALANCHE

VULNERABILITIES

Avalanche risk is primarily associated with canyon corridors and nearby mountainous terrain that support recreation and regional travel. While Morgan City's developed core is not located within mapped avalanche paths, transportation corridors such as I-84 and local canyon routes that serve residents, commuters, and emergency responders may be affected. Residents who rely on these corridors for work, school, medical care, or supply access are indirectly vulnerable to prolonged closures.

IMPACTS

Avalanche events can block highway and canyon travel routes, isolating portions of the community and disrupting commute patterns and emergency access. Extended closures may delay emergency response, affect delivery of goods and services, and create economic impacts for residents and businesses. Travel disruptions may also increase accident risk during rerouting or severe winter conditions.

DAM FAILURE

VULNERABILITIES

Morgan City lies downstream of upstream dams, including Lost Creek and East Canyon Reservoir facilities. Although the probability of dam failure is considered low, potential inundation areas include portions of the Weber River corridor and associated infrastructure. Vulnerable assets may include transportation routes, bridges, utilities crossing flood-prone areas, and structures located within potential inundation zones. Emergency access routes and communication systems may also be affected.

IMPACTS

A dam failure event would likely result in rapid downstream flooding, creating life-safety risks for residents and visitors in affected areas. Impacts could include evacuation needs, structural damage, road and bridge closures, and disruption of water, sewer, and power infrastructure. Emergency operations could be challenged by transportation interruptions and debris within inundation areas.

DROUGHT

VULNERABILITIES

Drought is characterized in the 2021 plan as a high-frequency hazard with a 70% annual probability of occurrence, affecting water supply and agriculture. The plan notes that Morgan City is generally cooler and wetter than much of the County and state but still experiences almost annual drought impacts on reservoirs and canals. Drought contributes to problem soils, which are also ranked high (CPRI 2.95) due to expansive and collapsible soils in valley developments that can damage foundations, pipelines, and pavements.

Drought conditions occur across large geographic areas, so all critical facilities, infrastructure, populations, and other community assets in Morgan City are potentially exposed when drought occurs.

IMPACTS

Drought can stress the City's primary and secondary water systems, potentially leading to water-use restrictions. Prolonged drought increases wildfire and erosion risk near wildland–urban interface (WUI)-adjacent communities and can contribute to differential settlement and cracking of public buildings,

sidewalks, and underground utilities over time, increasing maintenance costs and safety hazards (e.g., trip hazards).

In addition to stressing culinary and secondary water systems, drought can affect people and households through water-use restrictions, reduced outdoor irrigation, and increased costs for conservation measures and landscape replacement. Prolonged drought can also compound public health risks, including increased wildfire smoke exposure during nearby fires, heat stress during hot/dry periods, and reduced air quality from dust and dry soils. Residents who are older, have respiratory conditions, rely on outdoor work, or have limited resources to adapt may experience disproportionate impacts.

EARTHQUAKE

VULNERABILITIES

Morgan City lies on the Weber Segment of the Wasatch Fault Zone, where a M6.5–7.0 earthquake could cause severe structural and infrastructure damage. The 2021 Pre-Disaster Mitigation Plan notes that earthquakes are "multi-hazard events" with high probability of future occurrence and severity ranging from "limited to catastrophic." A 1,500-foot fault-damage buffer has been mapped around Quaternary faults, including the East Canyon and Saleratus Creek faults, to guide siting of critical facilities.

Morgan City government buildings, critical infrastructure, and utilities are exposed to strong ground shaking and potential secondary effects such as landslides, dam failure, and loss of road access. Earthquake hazard areas identified within the municipal boundary are limited to the outskirts of town. Two faults at the north side of town create a fault hazard zone that encompasses the area surrounding Exit 103 north of the I-84 corridor.

As shown in the ground shaking potential map included in the base plan, all critical facilities are vulnerable to strong to very strong ground shaking from an earthquake. Power, water, transportation, and communication infrastructure throughout the city are also exposed and vulnerable to damage.

Morgan County parcel data indicate there are a total of 2,023 structures within Morgan City. Of those, 391 were built prior to 1973, when seismic building codes were introduced, and 768 were built before 1987, when statewide seismic building codes were adopted. Structures built prior to these building codes are more vulnerable to damage. Data were not available regarding how many structures in the city are constructed of unreinforced masonry.

Earthquakes can disproportionately affect residents who may have difficulty evacuating or safely sheltering in place, including older adults, people with disabilities, medically dependent individuals, and households without reliable transportation. Residents living in older housing stock may face higher risk of injury and displacement if buildings are not built or retrofitted to modern seismic standards. Lower-income households and renters may have fewer resources for preparedness supplies, temporary relocation, and recovery, increasing the likelihood of prolonged disruption following a damaging earthquake.

IMPACTS

A major earthquake could result in injuries or fatalities to city employees and residents, interior and non-structural damage (ceilings, lighting, contents), and prolonged closure of the city's critical infrastructure and critical facilities. Transportation corridors (especially I-84 and key bridges over the Weber River) and utilities provided to city residents and businesses could be disrupted, limiting daily functions and the city's ability to provide services in government offices.

EROSION

VULNERABILITIES

Erosion risk in Morgan City exists mostly northeast of town just on the other side of I-84, as well as southeast of town above Ridgeline and Imperial Drives. Most of these areas also have steep slopes. North of the highway, newer hillside developments may experience erosion or more serious soil issues in the future.

Three critical facilities are located in moderate or severe erosion hazard areas within Morgan City, including the Family Tree Assisted Living Center, a state road shed, and the Morgan LDS Stake Center.

Using the Federal Emergency Management's (FEMA) USA Structures data, Table 63 shows the number of Morgan City structures in erosion hazard areas. Based on 310 residences in hazard areas, and an average household size of 3.49 in Morgan County, approximately 1,082 people are vulnerable to erosion hazard.

Table 63: Structures in Erosion Hazard Areas

Occupancy Type	Moderate Hazard	Severe Hazard
Residential	189	121
Unclassified	41	10
Total	**230**	**131**

Erosion-related impacts can create vulnerabilities for people, particularly where erosion affects hillside development, access roads, and utility corridors. Residents living in or traveling through areas adjacent to steep slopes may face increased risk from slope erosion, loss of shoulder support, or localized ground instability that can affect driveways, retaining features, and roadway edges. Erosion-related road impacts may also reduce reliable access for emergency response, school travel, and medical services, especially if a primary route is temporarily restricted or requires repair.

IMPACTS

Slope instability and erosion on steep hillsides and canyon areas can affect access roads, utility corridors, and hillside development near city catchment areas. Slope instability and erosion can create safety risks for residents and visitors through rockfall, debris movement, and damage to structures or retaining

features. Erosion-related roadway impacts can restrict access for emergency response, school travel, and medical services, and can isolate neighborhoods if a primary route is blocked. Impacts may also include temporary evacuations, prolonged repair periods, and increased household costs where private driveways, foundations, or drainage features are affected.

FLOODING

VULNERABILITIES

Flooding affects riverine areas along the Weber River and its tributaries, as well as localized pluvial flooding in developed valley bottoms. Morgan City critical facilities and key access routes lie within these valley systems, near rivers, canals, and storm-drain networks.

The City's watershed boundaries, waterways, and other water resources such as springs convey and channel water through the community, and these systems enhance the integrity of the natural environment by providing flood storage, stream bank stabilization, sediment trapping, pollutant trapping/attenuation, food chain support, fishery and wildlife habitat, and natural/passive recreation opportunities. Flood risk is substantial in Morgan City and its population. Most of the direct risk is on the northeast banks of the Weber River, particularly close to State Street and 250 E. Additional risk exists along the periphery of the FEMA 100-year floodplain, from anywhere between several hundred feet to over 1,000 feet in certain areas. This risk is mostly in the form of saturated soils, high water tables, and seasonal flood risk. Likewise, based solely on elevation and topography, there is also a likelihood for more extensive flooding throughout the vast majority of the developed city.

Critical facilities within the 1% annual chance flood hazard area include two multifamily residences, Riverside Park, and Wilkinson Rec-Plex. A public works facility identified as a state road shed is within the 0.2% annual chance flood zone.

Based on Morgan County parcel data, the market value of properties in the 1% annual chance floodplain is $92.3 million with a total building value of $58.3 million. Market value of properties in the 0.2% annual chance floodplain is $19.4 million with a total building value of $14 million.

FEMA's USA Structures building footprint data overlaid with that of the Special Flood Hazard Area (SFHA) shows a total of 167 structures within the 1% annual chance flood area[176]. Of those, 111 are residences, 47 are unclassified, and 9 are related to education. A total of 57 structures are in the 0.2% annual chance area, including 42 residences, 14 unclassified buildings, and 1 education structure.

Census block data within Morgan County overlaid with the SFHAs indicate that approximately 183 housing units and 518 people are in the 1% annual chance area. However, a limited number of blocks were selected, using only those that had their center in the flood zone. This was to avoid overcounting the population using all blocks that intersected with the floodplain. Another approach is to use the building

[176] Federal Emergency Management Agency (FEMA), Digital Flood Insurance Rate Map (DFIRM) – Morgan County, Utah, Effective December 7, 2017, https://msc.fema.gov

footprint data to estimate population. Based on 111 residences within the 1% annual chance flood area, and the average household size of 3.49, approximately 387 individuals reside in the 1% hazard area. An estimated 146 individuals reside in the 0.2% annual chance hazard area.

IMPACTS

Flood events could damage roads and bridges throughout the city, and cause localized inundation of roads, fields, and low-lying building areas, leading to temporary closures or costly repairs to city facilities. Flooding could disrupt water, sewer, and power services that rely on city infrastructure crossing flood-prone corridors. Assets at risk in the city include approximately 206 businesses, multiple educational facilities, one fire station, six churches, over 1,000 homes, approximately 24 miles of roads, 3.7 miles of canals, and agricultural lands located within mapped flood-prone areas. Impacts to infrastructure include flood damage to channels, culverts, and storm sewers located in the SFHA along the Weber River.

Flooding can affect people through hazardous driving conditions, access constraints, and potential evacuations in areas impacted by inundation. Flood events can disrupt employment and schooling, create health and safety concerns (e.g., exposure to contaminated water, mold in flood-damaged buildings), and result in stress and financial burdens associated with cleanup, temporary relocation, and insurance claims. Businesses may experience revenue loss and supply interruptions during closures, while households with fewer resources may face longer recovery periods.

HAIL

VULNERABILITIES

Morgan City is subject to seasonal hailstorms that can damage roofs, windows, siding, vehicles, and outdoor equipment. Residential structures with older roofing materials may be particularly vulnerable. Public facilities, city vehicles, and commercial properties may also sustain damage. Agricultural lands and landscaping within and surrounding the city may experience crop or vegetation impacts during severe hail events.

IMPACTS

Hailstorms can result in roof and exterior building damage, leading to water intrusion and interior damage if not promptly repaired. Residents and businesses may face repair costs, insurance claims, and temporary service disruptions. Severe hail events may also damage vehicles and outdoor infrastructure, contributing to economic losses within the community. While hail events are generally short-lived, their financial impacts can be significant.

HIGH WIND

VULNERABILITIES

Morgan City is exposed to periodic high wind events typical of northern Utah, including strong storm systems and seasonal wind events. Vulnerable assets include residential and commercial structures, particularly roof coverings, siding, windows, and attached exterior features. Above-ground utilities, power lines, street signs, fencing, and outdoor equipment are also susceptible. Mature trees and landscaped areas can contribute to falling branch hazards during high wind conditions. Older structures or buildings with aging materials may be more vulnerable to wind-related damage.

IMPACTS

High wind events can cause property damage, downed trees, and power outages affecting residents, businesses, and critical facilities. Debris may obstruct roadways, creating travel hazards and potentially delaying emergency response. Temporary utility interruptions may affect heating, communications, and water systems until restoration occurs. While typically localized and short in duration, wind events can generate repair costs and disrupt daily activities.

LANDSLIDE

VULNERABILITIES

Landslide risk in Morgan City is minimal. Several historic landslides and steeper hillsides conducive to increased landslide risk exist in the northeast and south of town.

One critical facility, the Living Tree Assisted Living Center, is within an area of moderate landslide susceptibility. The total market value of city properties exposed to moderate or high landslide susceptibility is over $72 million based on Morgan County parcel data. The building value of these properties totals $51.7 million. FEMA's USA Structures building footprint data overlaid on the landslide susceptibility data indicate that 39 residences and 7 unclassified structures in Morgan City are within areas of moderate landslide susceptibility, and none are within high landslide susceptibility. These structures are primarily in the northeastern area of the city. Based on an average household size of 3.49 in Morgan County, an estimated 136 people reside in areas of moderate or high landslide susceptibility.

IMPACTS

A major landslide could result in injuries or fatalities to city employees and residents, exterior and structural damage to foundations from shifting soils, and prolonged closure of the city's critical infrastructure and critical facilities in proximity to the slide. Transportation corridors (especially I-84 and key bridges over the Weber River) and utilities provided to city residents and businesses could be disrupted, limiting daily functions and the city's ability to provide services in government offices. Potential

losses from landslide include 18 businesses, 1 park, 5 homes, 1 mile of roads, 1 cemetery, and some agricultural and source water protection areas.

PROBLEM SOILS

VULNERABILITIES

Problem soils are plentiful throughout much of Utah. Most of the time these soils do not pose an immediate threat to public property, structures, or human life. However, in the right conditions, they can cause extensive structural damage. In Morgan City, these soils surround the developed areas and are also prevalent along the Weber River corridor. Soils along the Weber River floodplain are problematic for development with basements due to typically high water tables.

Soil related hazards vary with individual soil types and include the following characteristics:

- High water table (30 inches or less)
- Rock outcrops
- Bedrock depths of less than 20 inches
- High shrink-swell potential
- Potential areas with collapsible soils
- Very high or high erosion hazard
- Strong salt or alkali effect
- Very rapid or rapid permeability
- High water runoff potential
- Susceptibility to hillside slippage

Basements may also be problematic in areas with shallow depths to bedrock. Areas shown as problematic for development without basements may include steep foothill/mountain conditions, rock outcrops, high erosion hazards, high runoff potential, and susceptibility to hillside slippage.

While data describing soil types are available in Morgan City, supplementary information to clarify the soil classifications and determine which could be considered problem soils was unavailable. This limited the ability to conduct a quantitative analysis of critical facilities or other assets exposed to problem-soil hazard.

IMPACTS

Impacts from problem soils could result in exterior and structural damage to foundations from shifting soils, and prolonged closure of the city's critical infrastructure and critical facilities in proximity to the event. Transportation corridors (especially I-84 and key bridges over the Weber River) and utilities

provided to city residents and businesses could be disrupted, limiting daily functions and the city's ability to provide services in government offices. Potential losses include 144 businesses, 16 school structures, 2 churches, over 1,000 homes, over 15 miles of roads, 2.5 miles of transmission lines, and many acres of local farmland.

RADON

VULNERABILITIES

Radon ranks second in the updated hazard prioritization. Morgan City is classified as EPA Zone 2 (2–4 picocuries per liter [pCi/L]), with elevated indoor radon levels documented in basements and older structures. Buildings with slab-on-grade construction, crawlspaces, or basement areas—particularly older government buildings—may accumulate radon if not properly tested and mitigated.

Radon occurs naturally and can be found across much of Morgan City. The average radon test score in the ZIP code is 5.8 pCi/L, and 47.8% of tests in the area are above the 4 pCi/L threshold. Populations throughout the city may be exposed to various concentrations of radon. Because the accumulation of radon in buildings varies both with the location of the structure and with various factors in building construction characteristics just mentioned, the best way to determine vulnerability in critical facilities and other structures is to use radon testing kits in individual structures.

IMPACTS

Radon is a long-term, chronic health hazard rather than an acute life-safety threat. Unmitigated radon exposure increases lifetime lung cancer risk for city employees and contractors who spend many hours in ground-floor or basement rooms. Testing, mitigation, and ongoing monitoring in Morgan City facilities are therefore critical for protecting indoor air quality.

In addition to its effects on indoor air quality in public buildings, radon also poses a broad health concern for people who spend extended time indoors (including children and older adults) and households with basements or ground-contact living spaces. Because radon risk is not visible or detectable without testing, residents may be unaware of elevated levels. Households with limited resources may face barriers to testing and mitigation, increasing the likelihood of prolonged exposure over time.

SNOWSTORMS AND EXTREME COLD

VULNERABILITIES

Snowstorms and extreme cold are frequent and disruptive. City planning documents note frequent heavy snow events that affect canyon routes, utilities, and emergency access. City residents are dependent on personal vehicles traveling on steep, winding roads and I-84; heavy snowfall, ice, and reduced visibility increase vehicle crash risk.

Snowstorm conditions occur across large geographic areas, so all critical facilities, infrastructure, populations, and other community assets in Morgan City are potentially vulnerable to these storms.

IMPACTS

Impacts include government, school, and business closures, delayed starts, transportation disruptions, and increased heating demands. Prolonged outages of electric or natural-gas service during cold spells could compromise indoor temperatures, sprinkler systems, and technology infrastructure. Residents and city employees working and traveling outdoors are exposed to frostbite and hypothermia risks during extreme cold events, especially if proper clothing is lacking.

WILDFIRE

VULNERABILITIES

First Street Foundation's analysis shows nearly all properties in Morgan City have some wildfire risk, with approximately 17% of properties at "Major" or higher risk. Morgan City residential areas depend on volunteer fire protection districts and limited road networks for evacuation. The eastern and southern edges of the city are at potential risk from wildfires. Development—particularly east of the highway—is at the greatest risk, and development patterns show it could be at even greater risk in the future.

Two critical facilities in Morgan City are in an area with a high wildfire structure exposure score: Family Tree Assisted Living Center and a state road shed. Based on FEMA's USA Structures building footprint data, 198 residences and 27 unclassified structures are within areas with high wildfire structure exposure scores. Total market value for parcels within Morgan City in areas with high exposure scores is $159.7 million. Building values make up $111.2 million of that amount.

IMPACTS

A major wildfire event could result in injuries or fatalities to city employees and residents, destroyed or damaged structures, displacement of residents, and prolonged closure of the city's critical infrastructure and critical facilities damaged by wildfire. Transportation corridors (especially I-84 and key bridges over the Weber River) and utilities provided to city residents and businesses could be disrupted, limiting daily functions and the city's ability to provide services in government offices located in WUI areas. Smoke and poor air quality can force cancellation of outdoor activities and alter ventilation strategies, even when fires burn in neighboring counties. Potential losses include 7 businesses, 1 park, 112 homes, over 10 miles of roads, and minimal lengths of transmission lines and pipelines located in WUI areas.

Population Exposure and Social Vulnerability

Morgan City is projected to grow from 4,071 people in 2020 to between 5,000 and 8,400 by 2040 (see Figure 74). Morgan City is experiencing growth and development pressure, and the demand for housing

of all types, including affordable housing, is one of the key challenges facing the city, which increases vulnerability to identified hazards.

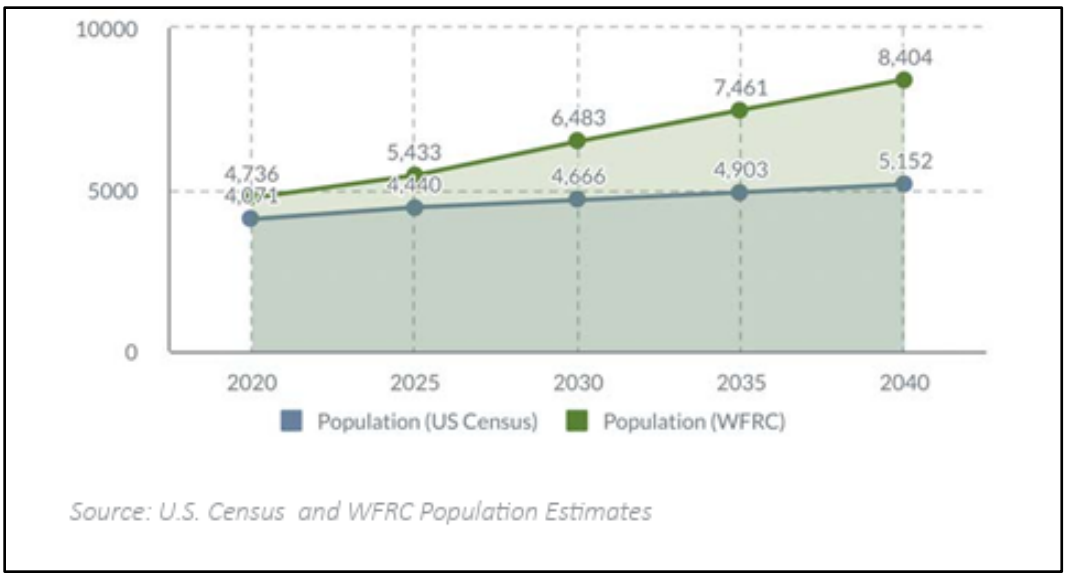


Figure 74: Wasatch Front Regional Council Projection versus U.S. Census Bureau Projection[177]

- **Morgan City Residents:** The total number of city residents is projected to increase, presenting new challenges for hazard risk-reduction efforts.
- **Morgan City Workforce:** The U.S. Census Bureau reported a total of 1,985 Morgan City residents in the civilian labor force as of 2024[178]. Since 2019, the number of those employed in Morgan City has grown by approximate 10%, increasing the number of people vulnerable to hazard risk.
- **Socioeconomic Factors:** Morgan City's median household income of $108,309 and 4.6% poverty rate indicate relatively strong household capacity to prepare for and recover from disasters, but high housing costs and limited rental stock can constrain post-disaster relocation options.

Critical Facilities and Lifelines at Risk

Morgan City's critical assets and facilities depend on the following:

- **Transportation:** I-84, state routes, canyon roads, and local streets that are vulnerable to snowstorms, landslides, flooding, and post-earthquake damage. Road construction and maintenance in the city are currently constrained by available funding. City maintenance is challenged in addressing immediate needs and making long-term planning goals to better coordinate city infrastructure and utility projects. As new areas are developed, there is a need for coordination of water and sewer infrastructure needs with road construction to add buried infrastructure.

[177] Morganutah.gov, "Morgan City General Plan 2024," 2024, https://www.morganutah.gov/planning.
[178] U.S. Census Bureau, "DP03: Selected Economic Characteristics," 2024, https://data.census.gov/table/ACSDP5Y2024.DP03?q=economic+morgan+city+utah

- **Fire and Emergency Medical Services (EMS):** A volunteer county fire department and a separate Mountain Green Fire Protection District, both serving local neighborhoods.
- **Water and Sewer:** Culinary water from springs and wells in Morgan City and private water companies in unincorporated areas, plus sewer service from Morgan City and the Mountain Green Sewer Improvement District; both systems are sensitive to drought, contamination, and infrastructure damage. Portions of the sewer infrastructure require upgrades as additional development or annexation of new land increases the city's sewer demands.
- **Power and Communications:** Morgan City Power and Rocky Mountain Power transmission lines serve most facilities; outages due to wind, snow, wildfire, or earthquakes would affect life-safety systems, heating/cooling, and operational continuity.

Built Environment and Structures/Land at Risk

Development of the built environment can significantly alter natural waterways and their related floodplains, which can impair the value of the riparian ecosystem or result in direct impacts such as flooding. Figure 75 indicates the location and extent of the SFHA (shown in blue), areas subject to a 1% or greater annual chance of flooding, as designated by FEMA. Development within SFHAs must comply with Morgan City building codes and floodplain ordinances and FEMA floodplain management regulations, which may require mitigation measures or mandate the purchase of flood insurance in certain flood zones.[179]

[179] Morganutah.gov, "Morgan City General Plan 2024," 2024, https://www.morganutah.gov/planning.

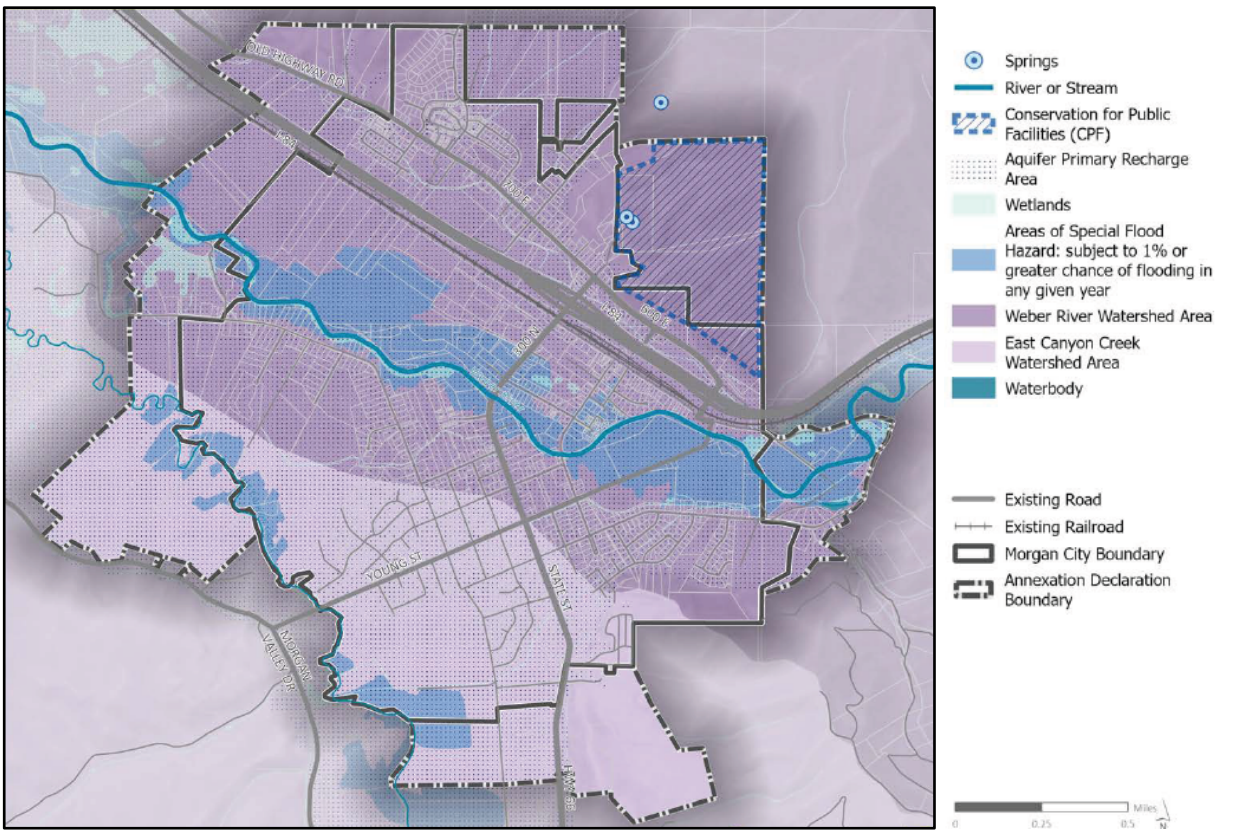


Figure 75: Morgan City Water Resources with Special Flood Hazard Areas

Changes Since the Last Plan Update

On September 10, 2025, Morgan City Council unanimously approved Resolution 25-23, which formalized a development agreement between Morgan City and Cloverland Investment LLC and Wasatch West to facilitate new developments for a new subdivision that has already received preliminary approval. The resolution demonstrates Morgan City Council's proactive approach to adapting to legislative changes and enhance community infrastructure, setting a positive precedent for future developments.[180]

In addition, the city recently made repairs to the municipal water infrastructure and updated the water rate structure to charge high-volume water users higher per-gallon rates. Between system repairs and water-conservation measures encouraged in part by the updated rate structure, the city is now able to save over 4,000,000 gallons of water annually.

Future Vulnerability Considerations

Morgan City's future development might take many forms. Steep slopes constrict development to the east and north of the city. There is ample opportunity for development to occur in agricultural lands to the

[180]Morgan City, "Council Meeting 9-23-35," 2025, https://www.morganutah.gov/media/9756 .

west and south of the city, although much of this land is susceptible to flood risk and may present issues of water quality and erosion. Clustered development and a concentration of growth in the existing downtown would allow for growth while reducing the expansion of hazard potential.

Looking ahead, Morgan City's vulnerability is expected to increase without targeted mitigation due to the following:

- **Continued Population Growth:** Projections show population rising to approximately 8,400 residents by 2040, based on Wasatch Front Regional Council (WFRC) estimates.
- **Climate Change:** More frequent rain-on-snow events, earlier snowmelt, prolonged dry periods, and hotter summers will alter flood, drought, wildfire, and air-quality patterns, affecting school operations and infrastructure.
- **Aging Infrastructure and Problem Soils:** As buildings and underground utilities age, cumulative impacts from expansive/collapsible soils and repeated hazard events (freeze–thaw cycles, drought, minor floods) will grow, increasing maintenance needs and the likelihood of performance issues during major events.
- **Resource Constraints:** Morgan City development is limited in the capacity of its existing infrastructure to accommodate additional built environment growth. Limited sewer line capacity is the most significant infrastructure challenge for development.

Capability Assessment

Morgan City adopted a new General Plan in 2024, consistent with state requirements. The City maintains zoning, land use, and development regulations that support public health, safety, and orderly growth. Hazard-related considerations are addressed through planning documents, zoning provisions, and coordination with Morgan County and other regional partners.

Morgan City issues building permits and enforces applicable building codes, with certain services coordinated or contracted in partnership with Morgan County. Through this structure, the City integrates hazard mitigation into land use review, permitting, and development processes, while relying on regional coordination for technical resources and specialized services.

Planning and Regulatory

Table 64 summarizes planning and regulatory capabilities for this planning area.

Table 64: Morgan City Planning Capabilities

Plan/Document	Purpose and Relevance to Hazard Mitigation
Morgan City General Plan	The Morgan City General Plan (2024) provides a future vision for the City that balances current and future needs and desires. The purpose of the plan is to provide clear policy direction to help ensure the community develops in a manner that meets existing needs while maximizing unique opportunities and likely changes. One policy of the plan continues to recognize the hazards of development on unsuitable and less suitable lands and seeks to protect people and property by enforcing guidelines and regulations that prevent development in areas that cannot be effectively mitigated and ensure proper mitigation of site hazards and constraints where feasible.
Morgan County Pre-Disaster Mitigation Plan (2021 Update)	FEMA-approved multi-jurisdictional hazard mitigation plan that evaluates regional natural hazards, including Morgan City, special districts, and unincorporated areas; adoption enables participating jurisdictions and their partners to be eligible for FEMA Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance (FMA), and Building Resilient Infrastructure and Communities (BRIC) funding for long-term risk-reduction projects that can benefit Morgan City critical facilities and community lifelines.
Morgan County Local Hazard Mitigation Plan Update (in progress)	Current effort to update the 2021 plan; the process explicitly includes Morgan City and will produce a dedicated Morgan City annex, helping align city mitigation actions with county and special district strategies and funding opportunities.
Morgan County General Plan (most recent update)	Countywide land use and growth management framework that guides residential and infrastructure development in Morgan City; by steering growth and infrastructure away from high-risk areas, it indirectly reduces future hazard exposure of city critical facilities and community lifelines.
Utah Enhanced State Hazard Mitigation Plan	State-level plan that defines mitigation priorities, identifies funding streams, and includes statewide programs for seismic safety, flood risk reduction, wildfire mitigation, and other hazards affecting communities; provides the policy and funding context for Morgan City's participation in FEMA mitigation programs.

Table 65 summarizes regulatory capabilities for this planning area.

Table 65: Morgan City Regulatory Capabilities

Policy/Code Name	Code Number (if applicable)	Year	Purpose & Relevance to Hazard Mitigation
Subdivision Ordinance	Title 11.03	2025	To regulate future growth and development activity within the city in a manner that promotes the physical integration of housing options, the preservation of community values, and the social integration of residents from diverse backgrounds under the General Plan; and to promote the efficient and orderly growth of the city. This ordinance also serves to safeguard the city from fire, flood, geological, and other dangers.
Flood Control Ordinance	Title 12.02	2010	To promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas.
Building Codes	Utah Code Title 15A – State Construction and Fire Codes Act; Adopted Locally by Reference: Morgan City Municipal Code, Title 9	2021	Enforces state-adopted building codes addressing structural integrity, seismic design, snow loads, wind resistance, fire protection, and flood-resistant construction where applicable. Supports reduced structural vulnerability and safer construction practices consistent with statewide standards and substantial-improvement practices.
Zoning Regulations	Title 10	2002	To preserve and promote the health, safety, morals, convenience, order, and the general welfare of the city and its present and future inhabitants, and to encourage and facilitate the orderly growth and expansion of the city.
Fire Code	Utah Code Title 15A – State Fire Code; Local Adoption: Morgan City Municipal Code Title 9.6	2021	Establishes standards for fire prevention, life safety, hazardous materials management, emergency access, defensible space (where applicable), and fire protection systems. Supports wildfire and structural-fire risk reduction.

Policy/Code Name	Code Number (if applicable)	Year	Purpose & Relevance to Hazard Mitigation
Land Use Regulations	Title 10.16, 10.02.110	2002	Provides limits and restrictions on land use within the corporate limits of the municipality. The city recognizes the important balance that must be maintained between interests in agricultural land and other competing land uses and conforms to federal, state, and local ordinances and regulations.
Utah Fire Prevention and Safety Act	Utah Code 53-7 (referenced in Utah Enhanced State Hazard Mitigation Plan)	1993	Establishes authority of the State Fire Marshal and local fire officials to enforce fire safety rules on buildings and properties within the City's jurisdiction, supporting fire-resistant construction, inspections, and correction of fire hazards in Morgan City buildings.
Management of Forest Lands and Fire Control	Utah Code 65A-8-1	1993	Provides a framework for wildfire prevention and control, including reciprocal fire protection agreements; supports wildfire risk reduction and response around Morgan City facilities in wildland–urban interface areas.

Administrative and Technical

Table 66 summarizes administrative capabilities for this planning area.

Table 66: Morgan City Administrative Capabilities

Agency/Organization/ Partnership	Sector	Role in Hazard Mitigation and Resilience
Planning and Zoning	Planning Department (Planner on contract, Citi Design)	Integrates hazard mitigation considerations into land use decisions, zoning regulations, and development review; coordinates with county and state partners to avoid or reduce development in floodplains, steep slopes, and other hazard-prone areas.
Engineering Department	Planning and Zoning (engineers contracted, not in-house)	Designs, reviews, and oversees public infrastructure projects (roads, drainage, utilities) with consideration of flood risk, erosion, problem soils, and long-term infrastructure resilience; supports implementation of mitigation projects.
Floodplain Manager	Public Works	Administers NFIP floodplain management requirements, reviews development proposals in Special Flood Hazard Areas, enforces floodplain ordinances, and coordinates FEMA map updates and substantial damage/substantial improvement determinations. This function is provided through the City's contracted engineering services (JA Jones & Associates) and is coordinated as development reviews arise and periodically (a few times per year) for general program needs.
Emergency Manager (City Manager)	City Administration	Coordinates preparedness, response, recovery, and mitigation activities; leads local emergency planning; supports integration of mitigation actions into emergency operations and continuity planning.
Grant Administrator (City Manager)	City Administration	Identifies, applies for, manages, and administers state and federal grants (including hazard mitigation and resilience funding) and ensures compliance with reporting and documentation requirements.
Building Inspector/Code Enforcement	Public Works (contracted through the County, as applicable)	Enforces adopted building codes and applicable floodplain requirements through plan review, permitting, and inspections; supports compliance for new construction and substantial improvements that reduce hazard vulnerability.

Table 67 summarizes technical capabilities for this planning area.

Table 67: Morgan City Technical Capabilities

Capability	Role in Hazard Mitigation and Resilience
Surveyors (JA Jones)	Provide elevation, boundary, and site data used to support floodplain determinations, infrastructure design, drainage analysis, and development review in hazard-prone areas.
GIS or HAZUS Specialists (JA Jones)	Support mapping and analysis of hazard exposure (floodplains, wildfire interface, infrastructure, critical facilities) using GIS datasets; assist with planning-level risk assessment and mitigation-project prioritization.
Grant Administrator (Morgan City Administration, with consultant support as needed)	Provides technical capacity to prepare mitigation-grant applications, track project costs, document benefits, and comply with state and federal funding requirements.
Benefit-Cost Analysis Specialist (not currently available in-house; provided by consultants or partners as needed)	Supports FEMA Hazard Mitigation Assistance applications by preparing or coordinating benefit-cost analyses to demonstrate the cost-effectiveness of mitigation projects.

Financial

Table 68 summarizes financial capabilities for this planning area.

Table 68: Morgan City Financial Capabilities

Funding Source	Type (Pre- or Post-Disaster)	Purpose and Relevance to Hazard Mitigation
Emergency Management Fund	Pre-Disaster	Funded through property and sales tax revenues and used to support emergency management planning, preparedness, and eligible resilience-related activities as identified by the City.
Community Development Block Grants (CDBG)	Pre- and Post-Disaster	Can be used to support infrastructure improvements, housing rehabilitation, and community facilities that reduce vulnerability, particularly for low- and moderate-income populations. Morgan City's CDBG eligibility is limited and has primarily supported ADA/accessibility-related projects rather than major infrastructure investments.
Capital improvements project funding	Pre-Disaster	Supports planned upgrades to roads, drainage, water, sewer, and public facilities, allowing hazard mitigation measures (e.g., flood protection, erosion control) to be incorporated into routine projects. Morgan City maintains a dedicated Capital Improvements Program

Funding Source	Type (Pre- or Post-Disaster)	Purpose and Relevance to Hazard Mitigation
		(CIP) fund and project list separate from the general fund, used for larger projects such as property acquisition and major infrastructure (e.g., bridges).
Authority to levy taxes for specific purposes	Pre-Disaster	Enables the City to raise dedicated revenue for infrastructure, public safety, or resilience-related needs when authorized, supporting long-term mitigation investments.
Fees for water, sewer, gas, or electric service	Pre-Disaster	Utility revenues can fund maintenance, upgrades, and hardening of critical lifeline systems to reduce service disruptions during hazard events.
Impact fees for homebuilders or developers for new developments/homes	Pre-Disaster	Allows the City to require new development to contribute to infrastructure capacity and improvements, helping offset hazard impacts from growth in flood-, wildfire-, or infrastructure-constrained areas.
Incur debt through general obligation bonds	Pre-Disaster	Provides a mechanism to finance large-scale capital and mitigation projects that benefit the broader community, subject to voter approval.
Incur debt through special tax and revenue bonds	Pre-Disaster	Allows targeted financing for infrastructure or utility projects that support resilience, repaid through dedicated revenue streams rather than general taxation.
Incur debt through private activity bonds	Pre-Disaster	May support certain public-private infrastructure or redevelopment projects that incorporate hazard mitigation or resilience components, where legally permissible.
Withhold spending in hazard-prone areas	Pre-Disaster	Enables the City to limit or avoid public investment in areas with high hazard risk, reducing future exposure and potential disaster losses.
State mitigation grant programs	Pre- and Post-Disaster	Includes Utah and state-administered FEMA programs that can fund flood, wildfire, seismic, and other mitigation projects identified in the hazard mitigation plan.
Other – FEMA Hazard Mitigation Assistance	Pre- and Post-Disaster	Federal funding programs available following plan adoption and disasters, supporting cost-effective mitigation projects such as flood protection, infrastructure hardening, and resilience planning.

Education and Awareness

Table 69 summarizes education and awareness capabilities for this planning area.

Table 69: Plan Participant Name Education and Awareness Capabilities

Capability	Lead Organization	Description
Methods of communicating with members of the public	Morgan City Administration	Morgan City does not currently publish a regular community newsletter; instead, it uses a notification app (e.g., Outify) for outages and key updates, utility billing inserts/mailers for service notices, and electronic readerboard signs to communicate time-sensitive public information, including hazard-related messages when applicable.
Hazard awareness campaigns (such as Firewise, Storm Ready, Severe Weather Awareness Week, school programs)	Morgan City; Morgan County Emergency Management; Utah partners	Morgan City participates in county- and state-led hazard awareness efforts (e.g., wildfire preparedness, severe winter weather, flood awareness) by sharing information through City channels and coordinating with emergency management partners. Morgan City has WUI exposure but has conducted limited wildfire-focused outreach to date, including a public meeting in recent years and incentives such as free dump passes for residents who clean up brush.
Public meetings/ events (Please describe)	Morgan City Council; Planning Commission	The City conducts regular City Council and Planning Commission meetings that provide opportunities for public input on land use, infrastructure projects, and planning initiatives that may affect hazard exposure and community resilience.
The Morgan News **(local newspaper)**	Local media outlet	The local newspaper remains in operation (not locally owned) and may be used as an additional channel for notices and hazard information as needed.
Hard copies of notices (e.g., public libraries, door-to-door outreach)	Morgan City Administration; Public Works	Morgan City provides hard-copy notices at City facilities (e.g., City Hall) and posts public notices as required; door-to-door outreach may be used on a limited basis for urgent issues or localized impacts. Hard-copy notices may also be posted in high-visibility locations such as the post office and community bulletin boards (e.g., Ridley's).
Insurance disclosures/ outreach	Morgan City; Morgan County Floodplain Manager	The City provides floodplain and insurance-related information as part of development review and floodplain permitting processes, and relies on NFIP-required notices and coordination with the County Floodplain Manager.

Capability	Lead Organization	Description
Organizations that represent, advocate for, or interact with underserved and vulnerable communities (Please describe)	Morgan County agencies; local nonprofits and faith-based groups	Morgan City coordinates indirectly with county social services, schools, and community organizations that serve seniors, lower-income households, and other vulnerable populations to share hazard-related information and resources. Morgan City primarily relies on Morgan County-led services (e.g., the senior center) and coordinates as needed with community-based supports such as the locally available food pantry (privately managed).
Other? (Please describe)	Morgan City; utility providers	The City uses utility billing inserts and service notices periodically to communicate infrastructure updates or safety information related to water, sewer, or other City services that have hazard-mitigation relevance.

National Flood Insurance Program Status

Morgan City participates in the National Flood Insurance Program (NFIP), which is a voluntary program based on a mutual agreement between the federal government and the community. This federally backed flood insurance is made available to communities that agree to regulate development in their mapped floodplains.[181] Table 70 summarizes NFIP status for this planning area.

Table 70: Morgan City NFIP Status[182]

CID[183]	Community Name	County	Initial FHBM Identified	Initial FIRM Identified	Current Effective Map Date	Regular-Emergency Program Entry Date
490093B	City of Morgan City	Morgan	06/28/74	07/16/87	12/07/17	07/16/87

- **Flood Zones:** Regulatory Floodway and SFHAs include Zones AE, AO, AH, VE, and AR. Base Flood Elevation information is provided for Zones A, V, and A99 where applicable.[184]

[181] Morganutah.gov, " Municipal Code-Title 12-Flood Control, Flood Damage Prevention," 2025, https://morgan.municipalcodeonline.com/book?type=ordinances#name=Title_12_FLOOD_CONTROL.
[182] National Flood Insurance Program, "Community Status Report Book, Utah," 2025, https://www.fema.gov/cis/UT.html.
[183] CID: Community Identification Number, FHBM: Flood Hazard Boundary Map, FIRM: Flood Insurance Rate Map, NFIP: National Flood Insurance Program.
[184] Federal Emergency Management Agency, "Flood Map Service Center-Morgan City, Utah," 2025, https://msc.fema.gov/portal/search?AddressQuery=Morgan%20City%20UTAh.

- **Floodplain Management Regulations and Compliance:** The Floodplain Development Permit is the mechanism that Morgan City utilizes to evaluate any and all impacts of activities proposed in Morgan City's regulated floodplains. All activities must comply with Morgan City's Floodplain Damage Prevention Ordinance. The National Flood Insurance Program provides flood insurance to individuals at much lower premiums than could otherwise be purchased through private insurers and makes certain federal funds available to local communities. In order for citizens to be eligible for the national flood insurance rates, or for communities to receive certain kinds of federal funds, the community must agree to meet minimum floodplain standards. The Floodplain Development Permit is the tool used to ensure Morgan City's Floodplain Damage Prevention Ordinance is met.[185]

  Any development that occurs within a designated floodplain must obtain a Floodplain Development Permit prior to the work commencing. In Title 44 of the Code of Federal Regulations, Part 59.1, FEMA defines development as "any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, or storage of equipment or materials." Other human activities that are considered development include, but are not limited to, alterations of a structure through additions, demolition, and/or remodeling; fences; retaining walls; movement or placement of manufactured or mobile homes; campgrounds; and storage of equipment, vehicles, and/or materials (e.g., storage yards and salvage yards).[186]

- **Adoption of NFIP Criteria:** Statutory Authorization: The legislature of the State of Utah delegated responsibility to local governmental units to adopt regulations designed to minimize flood losses. Therefore, the City Council of Morgan City, in Morgan County, State of Utah, adopted Title 12 – Flood Control Ordinance, which meets or exceeds minimum NFIP requirements.

- **Implementation Oversight:** The City's Public Works Director is appointed as the Floodplain Administrator to administer and implement the provisions of Title 12.02 Flood Damage Prevention Ordinance and other appropriate sections of 44 CFR Parts 59 and 60 (NFIP Regulations) pertaining to floodplain management.[187]

- **Substantial Improvement/Substantial Damage (SI/SD) Provisions:** Morgan City administers SI and SD determinations pursuant to Municipal Code Title 12 (Flood Control/Flood Damage Prevention), consistent with NFIP requirements.

  The City's designated Floodplain Administrator is responsible for the following:

  - Reviewing Floodplain Development Permit applications
  - Determining whether proposed work constitutes SI
  - Determining whether structures have sustained SD following a flood event
  - Ensuring compliance with elevation, floodproofing, and construction standards applicable within SFHAs

[185] Morganutah.gov, "Morgan City Floodplain Development Permit," 2025, https://www.morganutah.gov/media/9466.
[186] Morganutah.gov, "Morgan City Floodplain Development Permit," 2025, https://www.morganutah.gov/media/9466.
[187] Morganutah.gov, " Municipal Code-Title 12-Flood Control, Flood Damage Prevention," 2025, https://morgan.municipalcodeonline.com/book?type=ordinances#name=Title_12_FLOOD_CONTROL.

SI/SD determinations are made as part of the building permit and floodplain development review process. Documentation is maintained consistent with NFIP requirements related to flooding.[188]

- **Repetitive Loss (RL) and Severe Repetitive Loss (SRL) Properties:** At the time of this plan update, FEMA data indicate that Morgan City has one Repetitive Loss (RL) property, classified as a residential structure, and no Severe Repetitive Loss (SRL) properties..
- **Community Rating System (CRS) Participation:** Morgan City is not currently a participant.
- **Regional Coordination:** Morgan City coordinates with the WFRC to access regional planning resources, hazard data, transportation planning coordination, and land-use guidance that support floodplain management, geologic hazard awareness, and long-range resilience planning coordination.

Opportunities for Improvement

Table 71 identifies opportunities for improvement for this planning area.

Table 71: Morgan City Opportunities for Improvement

Opportunity Type	Description	Lead Organization
Planning and Regulatory	Build on existing land-use and floodplain regulations by integrating hazard mitigation priorities (flood, wildfire, problem soils, and seismic risk) more explicitly into zoning updates, subdivision review criteria, and capital planning documents to guide future growth away from hazard-prone areas.	Morgan City Planning and Zoning
Administrative and Technical	Strengthen internal coordination by formalizing cross-departmental mitigation coordination among Planning, Engineering, Public Works, and Emergency Management, including use of a Development Review Committee that allows applicants to meet with multiple departments early in the development process to identify and address hazard-related concerns. While the committee does not provide approvals, it supports coordination given limited personnel availability and reinforces ongoing coordination with Morgan County Emergency Management, recognizing that Morgan City relies on County-provided emergency management services.	Morgan City Administration
Financial	Expand the City's ability to implement mitigation projects by identifying and preparing shovel-ready projects and pursuing additional external funding sources, including state and federal hazard mitigation grants like the Hazard	Morgan City Administration

[188] Morganutah.gov, " Municipal Code-Title 12-Flood Control, Flood Damage Prevention," 2025, https://morgan.municipalcodeonline.com/book?type=ordinances#name=Title_12_FLOOD_CONTROL.

Opportunity Type	Description	Lead Organization
	Mitigation Grant Program and Pre-Disaster Mitigation Grant Program, while continuing to leverage capital improvement funding and utility revenues where appropriate.	
Education and Awareness	Enhance public understanding of local hazards by expanding hazard awareness outreach through coordinated use of newsletters, social media, public meetings, and partnerships with County Emergency Management, with a focus on flood risk, wildfire preparedness, and severe winter weather.	Morgan City; Morgan County Emergency Management
NFIP	Consider joining the Community Rating System (CRS) to reduce flood insurance costs for residents, strengthen floodplain management practices, and incentivize additional public outreach, mapping, and mitigation activities related to flood risk.	Morgan City

Mitigation Strategy

Status of Prior Actions

Table 72 summarizes the status of prior mitigation actions for this planning area.

Table 72: Morgan City Prior Mitigation Actions Status Updates

Hazard	Mitigation Action Item	Current Status (as of 2026 HMP Update)
Drought – Current Residents/Property	Improve public water infrastructure and management with water provider.	No progress, but there is a current project on the capital improvement plan to build a higher capacity water tank.
Drought – Current Residents/Property	Update and adopt drought ordinances.	No progress. Should be retained. Weber Basin Water Conservancy District has drafted a template ordinance which the City is planning to adopt.
Drought – Current Residents/Property	Enforce codes, ordinances, statutes, and laws that promote drought resilience.	In Progress. This action is completed through ongoing code enforcement. Last time there was a water shortage, the City doubled the overage rate. The City has adopted the new rate schedule.

Hazard	Mitigation Action Item	Current Status (as of 2026 HMP Update)
Dam Failure – Current Residents/ Property	Develop ordinances to prohibit or limit critical facilities and structures in dam-inundation areas.	No Progress. No longer a priority – current code does not allow building in the high-risk flood zone – should not be retained.
Dam Failure – Current Residents/ Property	Work with Utah Division of Water Rights and dam companies to update Emergency Action Plans (EAPs).	No Progress. The County is responsible for covering this – should not be retained.
Dam Failure – Future Residents/ Property	Develop ordinances to limit critical facilities in dam-inundation areas (future development).	No Progress. No longer a priority – current code does not allow building in the high-risk flood zone – should not be retained.
Dam Failure – Future Residents/ Property	Ensure new critical facilities/ infrastructure are not built in dam-inundation areas.	In Progress. This action is completed through ongoing code enforcement.
Drought – Current Residents/Property	Adopt and enforce drought ordinances.	No progress. Should be retained. Weber Basin Water Conservancy District has drafted a template ordinance which the City is planning to adopt.
Drought - Current Residents/Property	Monitor Water Supply for leaks system failures inefficiencies etc. via monitoring system and audits	In Progress. Recently replaced all meters in order to detect leaks more easily. Action rewritten (MGC-4).
Drought - Future Residents/Property	Retrofit Water Supply Systems to handle current and new growth	In Progress. Replacing meters (see above). Adding SCATA to system. Action rewritten (MGC-4).
Drought - Current Residents/Property	Expand and Improve Existing Potable Water Systems	In Progress; planning for a new water tank. Applied for a Bureau of Reclamation grant but was unsuccessful. Action rewritten (MGC-13).
Drought - Current Residents/Property	Designate and or preserve adequate source water protection zones or groundwater recharge areas	In Progress. Adding sumps to City's stormwater system (4 added recently). Action rewritten (MGC-4).
Earthquake - Current Residents/Property	Develop and/or review or adopt model earthquake hazard ordinance	No Progress. Action rewritten (MGC-5).

Hazard	Mitigation Action Item	Current Status (as of 2026 HMP Update)
Earthquake - Current Residents/Property	Building Code Adoption and Enforcement	Complete. Adopted current building code (state version). Hired a building inspector.
Earthquake - Future Residents/Property	Local Planning such as critical facilities planning financial incentives creating a safety committee emergency planning etc.	Complete. Participates in County LEPC.
Earthquake – Current Residents/Property	Conduct building safety inspections	Complete. Hired a building safety inspector (city employee). Current mitigation capability.
Flood – Future Residents/Property	Develop a stormwater management plan.	In progress. Engineer is currently assessing problem areas. Should be retained – MGC-1.
Flood – Future Residents/Property	Adopt and enforce building codes and development standards (flood-specific).	Complete. This is implemented on a regular basis through standard code enforcement; sensitive land ordinance was previously adopted and updated. This reflects a capability, rather than an action.
Flood – Future Residents/Property	Review/develop codes, ordinances, and policies related to flood risk.	Complete. The sensitive land ordinance was recently updated. No changes needed at this time – should not be retained.
Flood – Current Residents/Property	Preserve floodplains and open space through ordinances, land purchase, or conservation easements.	In Progress – City purchase 5 acres along the river. Should be retained – potential new property acquisition by East Canyon Creek. (MGC-2)
Flood – Current Residents/Property	Conduct regular maintenance of drainage systems and flood-control structures.	Complete. This activity is completed as a part of day-to-day City activities. This reflects a capability, rather than an action.
Flood – Future Residents/Property	Floodproof at-risk residential and non-residential structures.	No Progress.
Flood – Future Residents/Property	Elevate or retrofit facilities and infrastructure.	In Progress. Currently working on a box culvert project on the State St. Bypass. Anticipated to take ~30 homes out of the high-risk floodplain. Pending funding. Should be retained (MGC-14).
Flood – Future Residents/Property	Improve stormwater drainage capacity.	In Progress. Working on installing sumps in areas that get standing water. New subdivisions are also required to contain their own stormwater. Should be retained (MGC-1).

Hazard	Mitigation Action Item	Current Status (as of 2026 HMP Update)
Flood – Future Residents/Property	Protect infrastructure (roads, bridges, wastewater systems, etc.) from flood hazards.	In Progress. Currently working on a box culvert project on the State St. Bypass. Anticipated to take ~30 homes out of the high-risk floodplain. Pending funding. Should be retained (MGC-14).

2026 Mitigation Actions

Table 73 summarizes 2026 mitigation actions for this planning area.

Table 73: 2026 Mitigation Actions for Morgan City[189]

#	Action Title	Description	Hazard Addressed	Vulnerability	Goals	Lead Agency	Funding Source	Timeline	Priority
MGC-1	Citywide Drainage Master Plan	Complete a citywide drainage master plan and construct priority projects (larger culverts, upsized pipes, detention/retention basins, green infrastructure in streets and parks) to reduce riverine and pluvial flooding along Weber River, Cottonwood Creek, East Canyon Creek, and low-lying neighborhoods.	Dam Failure, Flood, Erosion, Problem Soils	Repetitive nuisance flooding and roadway ponding in valley-bottom neighborhoods; one RL property; aging storm drain system stressed by high-intensity storms and rain-on-snow events.	Protect life and property; reduce repetitive flood losses; maintain access to critical facilities and neighborhoods.	Morgan City Public Works/ Engineering	Local CIP; FEMA FMA, HMGP; Utah DEM flood-mitigation grants	1–5 years (planning in near term; construction phased)	High
MGC-2	Floodplain and Riparian Corridor Protection	Preserve floodplains and open space through ordinances, land purchase, and conservation easements. particularly along East Canyon Creek; use conservation easements, clustering, and setbacks to maintain natural flood storage.	Dam Failure, Flood, Erosion, Wildfire	Future growth pressure along waterways and valley bottoms could place new homes and infrastructure in high-risk flood corridors if not managed.	Avoid future risk; protect natural flood mitigation functions; support habitat and recreation.	Morgan City Community Development; Planning Commission	Local funds; land or conservation easement partners; possible FEMA FMA for acquisition	2–6 years (ongoing implementation)	High
MGC-3	Dam Inundation Overlay and Emergency Action Plan	Map dam-inundation zones for upstream facilities (e.g., Lost Creek, East Canyon). Ensure coordination between Community Development and other departments to enforce	Dam Failure, Flood	Downstream neighborhoods, transportation corridors, and utilities are within modeled	Protect life safety; support effective warning, evacuation, and land-use	Morgan City Emergency Management; Community Development	Local funds; Utah Division of Water Rights; FEMA HMGP (planning	1–4 years	High

[189] CIP: Capital Improvement Program, CRS: Community Rating System, DEM: Division of Emergency Management (Utah), EAP: Emergency Action Plan, EMPG: Emergency Management Performance Grant, EPA: Environmental Protection Agency, EOC: Emergency Operations Center, FMA: Flood Mitigation Assistance, FEMA: Federal Emergency Management Agency, FFSL: Forestry, Fire & State Lands (Utah), HMGP: Hazard Mitigation Grant Program, NFIP: National Flood Insurance Program, NGO: Non-Governmental Organization, NWS: National Weather Service, RL: Repetitive Loss, SFHA: Special Flood Hazard Area, UGS: Utah Geological Survey, WUI: Wildland–Urban Interface.

#	Action Title	Description	Hazard Addressed	Vulnerability	Goals	Lead Agency	Funding Source	Timeline	Priority
	(EAP) Coordination	code against building critical infrastructure in dam inundation zones.		dam-inundation areas; failure would cause severe, fast-onset flooding.	decisions in dam-inundation areas.		and warning improvements)		
MGC-4	Citywide Drought and Water-Loss Management Program	Partner with the city's water provider(s) to update, adopt, and enforce drought and water-conservation ordinances. Weber Basin Water Conservancy District has drafted a template ordinance which the City is planning to adopt.; implement tiered water rates, leak-detection and metering upgrades, source-water protection zones, and system retrofits/expansions to handle growth. Conduct public outreach on irrigation efficiency and indoor water-saving practices.	Drought, Erosion, Problem Soils	Growing population and hotter, drier summers stress limited water supplies; leaking or undersized systems and expansive soils increase risk of service disruptions and infrastructure damage.	Increase water reliability; reduce demand; protect infrastructure and source-water quality.	Morgan City Public Works; water provider(s)	Local water enterprise funds; Utah water-conservation grants; FEMA HMGP (where eligible)	1–5 years (phased)	High
MGC-5	Seismic Code Enforcement and Critical Facility Retrofit Program	Maintain adoption and enforcement of current seismic building codes; develop a model earthquake hazard ordinance and screening program to identify at-risk city-owned buildings (e.g., City Hall, public works, water facilities) and prioritize them for engineering evaluation and retrofit or replacement. Include nonstructural seismic bracing for utilities and equipment.	Earthquake	Morgan City lies near the Weber segment of the Wasatch Fault; some critical facilities and older structures may predate current seismic standards.	Protect life safety; maintain continuity of government and essential services after a major earthquake.	Morgan City Building Department; Public Works	Local CIP; FEMA HMGP; Utah Seismic Safety Commission/UGS programs (where available)	1–6 years (screening early, retrofits phased)	High

#	Action Title	Description	Hazard Addressed	Vulnerability	Goals	Lead Agency	Funding Source	Timeline	Priority
MGC-6	Geologic Hazard and Hillside Development Overlay	Create or update a geologic-hazard/hillside development overlay that requires geotechnical investigations, slope-stability analysis, and appropriate setbacks and foundation designs in areas mapped for landslides, steep slopes, erosion, and problem soils around Morgan City. Limit new access roads and utilities in high-risk slopes where alternatives exist.	Landslide, Erosion, Problem Soils	Development on and below steep slopes and areas of expansive/ collapsible soils can experience ground failure, settlement, and slope movement, damaging roads, utilities, and structures.	Reduce long-term damage to homes, streets, and utilities; avoid siting new development in unstable areas.	Morgan City Community Development	Local funds; technical support from Utah Geological Survey; FEMA HMGP (for high-risk areas or buyouts)	2–5 years	Medium –High
MGC-7	Wildland–Urban Interface (WUI) Land Use and Fuels Management Program	Develop or update WUI/wildfire codes and overlay districts to limit dense development in high-hazard foothill and canyon areas, require defensible space, fire-resistant landscaping and construction, adequate access and water supply, and enforce maintenance of fuels breaks around neighborhoods. Coordinate with fire agencies on community wildfire protection planning, Firewise sites, and post-fire flood mitigation.	Wildfire	Existing and future neighborhoods on the benches and canyon mouths are exposed to WUI fire and ember showers; growth could increase ignition risk and strain response.	Reduce structure ignition risk; protect evacuation routes; align land-use and fire planning.	Morgan City Community Development; Morgan County Fire District	Local funds; Utah FFSL wildfire grants; FEMA HMGP (fuels and WUI projects)	1–4 years	High
MGC-8	Resilient Critical Facilities and Backup Power	Prioritize city-owned critical facilities (e.g., City Hall/EOC, public works yard, water and sewer facilities) for structural hardening and installation of backup generators or battery storage to maintain heat, communications, and operations	Extreme Cold, Snowstorms, High Wind, Hail, Earthquake	Winter storms and downslope wind events have caused outages and access issues; loss of power or damage to critical facilities would	Maintain essential services and communications during multi-day outages and major disasters.	Morgan City Public Works; Emergency Management	Local CIP; FEMA HMGP; possible energy-resilience grants	2–6 years	High

#	Action Title	Description	Hazard Addressed	Vulnerability	Goals	Lead Agency	Funding Source	Timeline	Priority
		during snowstorms, extreme cold, high winds, earthquakes, and other disaster events.		impair response and utilities.					
MGC-9	High-Wind, Hail, and Urban Forestry Resilience	Update building and roofing standards to encourage or require wind- and impact-resistant materials for new and substantially improved buildings; promote retrofits for older roofs; implement a proactive tree-management program (species selection, pruning, and removal where necessary) to reduce limb and tree failures onto power lines, roads, and buildings during high wind and hail events.	High Wind, Hail, Severe Weather, Snow, Wildfire	Morgan City is exposed to convective storms and downslope wind events that can damage roofs, vehicles, trees, and overhead utilities.	Reduce building and vehicle damage; decrease outage frequency and blocked roadways from tree and line failures.	Morgan City Building Department; Parks/Urban Forestry; Public Works	Local funds; utility partnerships; FEMA HMGP (where eligible)	2–5 years	Medium
MGC-10	Citywide Radon Testing and Mitigation Outreach	Partner with the health department and local realtors/builders to promote radon awareness; encourage radon testing in existing homes; support mitigation for high readings; and incorporate radon-resistant new construction techniques into local building code or guidance.	Radon	Morgan County is in an elevated radon potential area; long-term indoor exposure threatens public health, especially in basements and ground-floor units.	Reduce chronic health risk from radon; improve indoor air quality.	Morgan City Building Department; Weber-Morgan Health Department	Local funds; homeowner cost-share; EPA/state radon grants (where available)	1–5 years	Medium
MGC-11	All-Hazards Public Education and Alerting Enhancements	Expand public outreach and messaging on mitigation actions the public can take across all hazards. These messages include: • Avalanche: Avoid traveling in steep backcountry terrain during high avalanche danger and	Avalanche, Dam Failure, Drought, Earthquake, Erosion, Extreme Cold, Flood, Hail, High Wind, Landslides, Problem	Many residents rely on social media and informal networks for warnings; some may not understand local hazard maps, codes, or protective actions.	Improve risk awareness and protective behavior; increase enrollment in alert systems; support equitable preparedness.	Morgan City Emergency Management; Public Information Officer	Local funds; EMPG; partnerships with county/state agencies and NGOs	1–3 years (ongoing)	Medium

#	Action Title	Description	Hazard Addressed	Vulnerability	Goals	Lead Agency	Funding Source	Timeline	Priority
		always check local avalanche forecasts before recreating. • Dam Failure: Know the City's dam inundation zones and identify evacuation routes ahead of time. • Drought: Provide information on strategies to reduce water consumption during droughts. • Earthquake: Promote household emergency planning and kits in case of an earthquake. • Erosion: Notify residents who live near high risk erosion areas. • Extreme Cold: Make sure residents are aware of and signed up to receive Code Blue alerts. • Flood: Educate residents on flood insurance availability. • Hail: Ensure residents are signed up for City and NWS emergency warning systems. • High Wind: Install storm shutters or reinforce windows and doors to prevent wind-borne debris damage. • Landslides: Notify residents who live near high risk landslide areas. • Problem Soils: Share a map of problem soils on the City website so residents can reference it.	Soils, Radon, Snowstorms, Wildfire						

#	Action Title	Description	Hazard Addressed	Vulnerability	Goals	Lead Agency	Funding Source	Timeline	Priority
		• Radon: Educate residents on the availability of radon testing and how to respond to high levels of radon. • Snowstorms: Keep roofs clear of excessive snow buildup to prevent structural stress or collapse. • Wildfire: Provide information on defensible space strategies around structures.							
MGC-12	CRS Feasibility and NFIP Enhancement Project	Conduct a Community Rating System (CRS) feasibility study for Morgan City, evaluate needed activities (e.g., improved flood mapping, outreach, higher regulatory standards), and implement priority steps to improve NFIP performance and reduce flood insurance premiums for residents.	Flood	Morgan City participates in the NFIP but is not currently in CRS; limited staff capacity and competing priorities have delayed CRS evaluation.	Strengthen floodplain management; reduce insurance costs; support safer development.	Morgan City Public Works/ Floodplain Administrator	Local funds; possible technical assistance from state NFIP office and FEMA	1–4 years	Medium
MGC-13	Install Higher Capacity Water Tank	The replacement of the current water tank for Morgan City with a higher capacity tank will allow for higher levels of water storage in preparation for water shortages.	Drought	During severe droughts Morgan City can run low on water for critical needs.	Reduce interruptions on critical facilities from drought	Morgan City Public Works	Local funds; FEMA HMGP	1-3 years	Medium
MGC - 14	Install Box Culvert at State Street Bypass	Through the installation of a box culvert at the State Street Bypass, approximately 30 homes will see significantly reduced flood risk.	Flood	During flood events homes near the State Street Bypass are vulnerable to severe flooding	Protect life safety, and property from impacts of flooding	Morgan City Public Works	Local funds; FEMA HMGP	3-5 years	High

#	Action Title	Description	Hazard Addressed	Vulnerability	Goals	Lead Agency	Funding Source	Timeline	Priority
MGC – 15	Stormwater Capacity and Drainage Improvements	Install sump pumps in area of the City that experience regular nuisance flooding from poor stormwater drainage. These pumps will reduce the impact of flooding on residences and roadways.	Flood, Erosion	Repetitive nuisance flooding and roadway ponding in valley-bottom neighborhoods; one RL property; aging storm drain system stressed by high-intensity storms and rain-on-snow events.	Protect life and property; reduce repetitive flood losses; maintain access to critical facilities and neighborhoods.	Morgan City Public Works/ Engineering	Local CIP; FEMA FMA, HMGP; Utah DEM flood-mitigation grants	1-3 years	High
MGC – 16	Floodproofing At-Risk Facilities	Develop a program to identify at risk facilities that are could reduce flood damages through floodproofing. Support implementation of floodproofing at those locations through grant funding.	Flooding	Flooding can disrupt functioning of City and private facilities, impacting both services and the local economy.	Protect life and property; reduce economic impacts of flooding	Morgan City Community Development	Local CIP; FEMA FMA, HMGP	3-5 years	Medium

Mitigation Actions Implementation and Monitoring

Morgan City will implement the mitigation actions identified in this annex through coordinated efforts among City Administration, Planning and Zoning, Engineering, Public Works, and Morgan County Emergency Management. Each mitigation action will be assigned a lead department or partner responsible for advancing the action, coordinating with external agencies as needed, and tracking its progress.

Implementation will be monitored on an ongoing basis through regular review of capital improvement plans, infrastructure projects, grant opportunities, and development activity. Progress tracking will include documentation of milestones such as feasibility studies completed, funding applications submitted, projects initiated, and projects completed. Morgan City will coordinate with Morgan County to report implementation status during annual plan reviews and to support updates required as part of the countywide Hazard Mitigation Plan maintenance process.

Plan Integration

Status of Prior Plan Integration

Morgan City participated in the 2021 Morgan County Pre-Disaster Mitigation Plan, but mitigation strategies were largely addressed at the countywide level, with limited documentation of formal integration into City-specific plans, policies, or capital programs. While floodplain management and development review processes have historically incorporated hazard considerations, prior mitigation actions were not systematically linked to City planning documents or tracked through a formal integration framework.

This limited level of integration reflects the City's historical reliance on county-led mitigation planning. Since the 2021 plan, Morgan City has adopted a new General Plan (2024), which includes policies addressing sensitive lands and hillside development constraints, marking an initial step toward more intentional integration of hazard integration. In addition, the City completed a hydrologic study associated with the State Street bridge to evaluate flood mitigation potential and inform future infrastructure decisions.

Future Plan Integration Methodology

To strengthen integration going forward, Morgan City will incorporate the mitigation priorities and actions identified in this annex into relevant City plans, programs, and decision-making processes. Integration will occur through the following:

- **Land Use and Development Review:** Incorporating hazard mitigation considerations into zoning updates, subdivision reviews, and site plan approvals to reduce exposure in flood-prone, wildfire-risk, erosion-prone, and problem-soil areas.
- **Capital Improvement Planning:** Aligning mitigation actions with capital improvement planning to ensure hazard reduction measures are incorporated into infrastructure investments such as roads, drainage, water, and sewer systems. The City's Capital Improvement Program (CIP) fund is reviewed by department heads and presented to the City Council, providing an opportunity to evaluate mitigation benefits as part of project prioritization.
- **Interagency Coordination:** Continuing coordination with Morgan County, special service districts, and state agencies to align mitigation actions with regional infrastructure, watershed, and emergency management initiatives, including coordination with the Morgan County Health Department office located in Morgan City, the Morgan School District, and other relevant local partners.

Plan Maintenance

Morgan City will maintain this annex by integrating mitigation actions into routine planning, infrastructure, and development review processes and by coordinating with Morgan County Emergency Management on implementation responsibilities and timelines. Responsibilities for maintaining mitigation-related actions will be shared among City Administration, Planning and Zoning, Public Works, and Emergency Management departments, as appropriate.

Continued Public Involvement

Morgan City will continue to provide opportunities for public involvement in mitigation planning and implementation through existing public engagement mechanisms. These include City Council and Planning Commission meetings, public notices, City communications, and coordination with Morgan County outreach efforts. The City will seek to expand public engagement by incorporating hazard mitigation topics into regularly scheduled meetings, sharing mitigation-related information through existing communication tools, including the City's website, where the public will be invited to submit feedback, and coordinating with County-led outreach efforts. Draft plan updates and mitigation priorities will be made available for public review as part of future Hazard Mitigation Plan updates, allowing residents, businesses, and stakeholders to provide input on local hazard concerns and mitigation strategies.

Monitoring, Evaluating, and Updating the Plan

Morgan City will review progress on mitigation actions at least annually in coordination with Morgan County Emergency Management. City staff may also participate in Local Emergency Planning Committee meetings, when convened, to support coordination and information sharing related to hazards and mitigation efforts. This review will evaluate the following:

- Progress toward the implementation of mitigation actions
- Changes in hazard conditions, development patterns, or infrastructure
- Availability of new hazard data, mapping, or funding opportunities

This Morgan City Annex will be formally updated as part of the next countywide Hazard Mitigation Plan update cycle, consistent with FEMA requirements. The City may also update the annex between plan cycles if significant changes occur, such as major infrastructure projects, annexations, hazard events, or regulatory updates that affect local risk or mitigation priorities.

Morgan School District Annex

Introduction

Morgan School District (MSD) serves as the primary kindergarten through 12th grade (K–12) education provider for Morgan County, Utah, operating eight public schools and programs[190] that together educate approximately 3,235 students in the 2023–2024 school year[191]. The district's campuses and programs are located in Morgan City and the rapidly growing Mountain Green area at the base of the Wasatch Range, along the Weber River transportation corridor. Morgan County itself is a small but fast-growing rural county of about 12,600 residents in 2023, with a relatively young population (about one-third under age 18), meaning that MSD facilities house a large share of the County's children on a daily basis[192].

Critical Infrastructure and Key Resources

For the purposes of this annex, MSD treats its instructional campuses, administrative facilities, and core support services as critical infrastructure and key resources because they concentrate most of the County's children and staff on a daily basis and are essential to continuity of education and community recovery. During the 2023–2024 school year, MSD served 3,235 students across eight schools with approximately 175 full-time classroom teachers and 12 administrators, plus additional support staff.

MSD owns and operates the following school facilities: Morgan High (1,143 students, grades 9–12), Morgan Middle (522 students, grades 5–8), Morgan School/Morgan Elementary (563 students, grades K–4), Morgan Preschool (37 students, pre-kindergarten [PK]), Mountain Green School (452 students, grades K–4), Mountain Green Middle (496 students, grades 5–8), Mountain Green Preschool (22 students, PK), and Morgan Online (districtwide K–12 virtual program). These facilities are clustered in two main nodes: the Morgan City education complex along East Young Street and North 200 East, and the Mountain Green campus area serving the rapidly growing western part of the County. The district office at 67 North 200 East in Morgan City houses central administration and several support functions.

In addition to school buildings, MSD's transportation, maintenance, food services, information technology (IT), and student support departments—all coordinated through the district office—are treated as key resources that support both daily operations and emergency response (e.g., student evacuation, feeding, communications, and rapid damage assessment). The district's bus fleet and routing system are especially

[190] Utah State Board of Education (USBE), School Directory – Morgan School District, 2024, https://schools.utah.gov/data/reports/schooldirectory
[191] Utah State Board of Education (USBE), Enrollment Report – Fall Enrollment Data Portal (Morgan School District), 2023–2024, https://datagateway.schools.utah.gov/
[192] U.S. Census Bureau, American Community Survey (ACS) 5-Year Estimates – Age Distribution, Morgan County, Utah, 2023, https://data.census.gov

important given the rural nature of Morgan County and the reliance of many students on school transportation.

MSD facilities depend on several external lifeline systems. Electric service is provided by Morgan City Utilities within city limits and Rocky Mountain Power in Mountain Green and other unincorporated areas. Rocky Mountain Power is the largest electric supplier in Morgan County and is actively upgrading the Mountain Green substation to meet growing demand. Natural gas service for school facilities is provided by the regional utility historically known as Dominion Energy and now operating as Enbridge Gas Utah, which supplies most natural gas customers in the state. Potable water, wastewater, and stormwater services are provided by Morgan City and by special service districts in Mountain Green, while some outlying areas rely on on-site septic systems. This mix of systems makes school operations sensitive to infrastructure outages and to water-quality issues during flood, drought, or wildfire-smoke events.

All MSD campuses rely on the Interstate 84 (I-84) corridor and connecting collectors such as East Young Street and North 200 East for daily access, school bus routing, and emergency response. This reliance creates vulnerability to winter storms, flooding, wildfire smoke, and post-earthquake transportation disruption.

Hazard Identification

Table 74: Hazards Identified and Exceptions for Morgan School District

Hazard	Applicable	Not Applicable	Rationale for Not Including
Avalanche	X		
Dam Failure	X		
Drought	X		
Earthquake	X		
Erosion	X		
Extreme Cold	X		
Flood	X		
Hail	X		
High Wind	X		
Landslides	X		
Problem Soils	X		
Radon	X		
Snowstorms	X		
Wildfire	X		

Vulnerability Analysis

Overall Vulnerability and Impact Summary

MSD serves approximately 3,181 students across eight schools (PK–12) in Morgan City, Mountain Green, and surrounding unincorporated areas. These facilities sit in the Weber River valley and foothill communities that face multi-hazard risk, including earthquakes, radon, severe winter storms, drought and problem soils, wildfire, flooding, and climate-driven heat and air-quality issues. Countywide, the population is about 13,372 residents, with 30.5% under age 18, indicating a high concentration of children and youth who spend a significant portion of their time in MSD facilities.

Morgan County's overall social vulnerability is relatively low due to high median household income (~$108,000) and a 4.6% poverty rate, but specific groups—children, older adults, and those with respiratory or cardiovascular conditions—face elevated risk from poor air quality, extreme cold, and disruptions to transportation and utilities. First Street Foundation climate risk data indicate that 99% of the County's 7,848 properties have at least some wildfire risk, 32.2% (2,529 properties) have fluvial or pluvial flood risk, and 86% of homes have at least a "Moderate" Heat Factor, with very hot days projected to increase from 7 days per year today to 16 days per year in 30 years. Poor air quality already affects 4,267 children and teens and 1,540 older adults in Morgan County.

For MSD, the highest-priority life-safety hazards are earthquakes (Community Planning and Risk Index [CPRI] 3.25), radon (3.25), snowstorms (3.0), drought and problem soils (2.95), wildfire (2.9), and flood (2.75), followed by extreme cold, high wind, erosion, dam failure, landslide, avalanche, and hail. These hazards threaten students, staff, school buildings, transportation systems, and supporting lifelines (power, water, sewer, communications).

EARTHQUAKE

VULNERABILITIES

Morgan County lies on the Weber Segment of the Wasatch Fault Zone, where a M6.5–7.0 earthquake could cause severe structural and infrastructure damage. The 2021 Pre-Disaster Mitigation Plan notes that earthquakes are "multi-hazard events" with high probability of future occurrence and severity ranging from "limited" to "catastrophic." A 1,500-foot fault-damage buffer has been mapped around Quaternary faults, including the East Canyon and Saleratus Creek faults, to guide siting of critical facilities. MSD schools, district offices, bus facilities, and utilities are exposed to strong ground shaking and potential secondary effects such as landslides, dam failure, and loss of road access.

IMPACTS

A major earthquake during school hours could result in injuries or fatalities, interior and non-structural damage (ceilings, lighting, contents), and prolonged closure of facilities even if buildings remain

structurally sound. Transportation corridors (especially I-84 and key bridges over the Weber River) and utilities that serve campuses could be disrupted, limiting the ability of buses, staff, and first responders to reach schools and affecting sheltering operations.

RADON

VULNERABILITIES

Radon ranks second in the updated hazard prioritization (CPRI 3.25). Morgan County is classified as EPA Zone 2 (2–4 pCi/L), with elevated indoor radon levels documented in basements and older structures. School buildings with slab-on-grade construction, crawlspaces, or basement areas—particularly in older campuses—may accumulate radon if not properly tested and mitigated.

IMPACTS

Radon is a long-term, chronic health hazard rather than an acute life-safety threat. Unmitigated radon exposure increases lifetime lung cancer risk for staff and students who spend many hours in ground-floor or basement rooms. Testing, mitigation, and ongoing monitoring in MSD facilities are therefore critical for protecting indoor air quality.

SNOWSTORMS AND EXTREME COLD

VULNERABILITIES

Snowstorms (CPRI 3.0) and extreme cold (2.63) are frequent and disruptive. County planning documents note frequent heavy snow events that affect canyon routes, utilities, and emergency access. MSD is highly dependent on school buses and personal vehicles traveling on steep, winding roads and I-84; heavy snowfall, ice, and reduced visibility increase crash risk and can delay or prevent student transport, including for special-needs students and out-of-district programs.

IMPACTS

Impacts include school closures, delayed starts, bus route disruptions, and increased heating demands. Prolonged outages of electric or natural-gas service during cold spells could compromise indoor temperatures, sprinkler systems, and technology infrastructure. Students who walk to school or wait at outdoor bus stops are exposed to frostbite and hypothermia risks during extreme cold events, especially if proper clothing is lacking.

DROUGHT

VULNERABILITIES

Drought affects water supply reliability, landscape irrigation, and long-term soil moisture conditions across Morgan County. MSD campuses rely on culinary and secondary water systems for drinking water, sanitation, cooling, and irrigation of athletic fields. Reduced reservoir storage, canal flows, and municipal restrictions may constrain water availability during prolonged drought conditions.

MSD serves approximately 3,181 students during the school year, representing a substantial share of the County's youth population. Students, particularly younger children and those with respiratory or heat sensitivity conditions, may be more vulnerable to extreme heat and air-quality effects associated with drought conditions.

IMPACTS

Drought may result in water-use restrictions affecting athletic fields and landscaping, reduced cooling efficiency during hot periods, and increased wildfire risk near wildland–urban interface (WUI)-adjacent campuses. Prolonged drought may also elevate dust and air-quality issues that affect outdoor activities.

Drought-related heat and air-quality conditions may affect student health, increase absenteeism, and require modifications of outdoor activities, especially for elementary-aged children and student-athletes.

PROBLEM SOILS

VULNERABILITIES

Expansive and collapsible soils in valley developments can cause differential settlement, foundation stress, cracking of sidewalks and pavements, and damage to underground utilities. Several MSD campuses are located in valley-bottom areas where shrink–swell cycles associated with drought and seasonal moisture variations may affect building performance over time.

IMPACTS

Impacts include long-term structural and non-structural maintenance needs, increased trip hazards from sidewalk displacement, pipeline stress, and higher lifecycle costs for facilities and grounds. These impacts are generally gradual but can compound over time. Settlement-related cracking or pavement displacement may create trip hazards affecting students, staff, and visitors, particularly young children and individuals with mobility limitations.

WILDFIRE

VULNERABILITIES

Wildfire has a CPRI score of 2.9 and is amplified by climate change, drought, and steep slopes. First Street Foundation analysis shows that 99% of properties in Morgan County have some wildfire risk, with approximately 17% of properties at "Major" or higher risk. Mountain Green and other west-slope communities are specifically identified as WUI areas with high exposure. MSD campuses in Mountain Green and Morgan City are embedded within or adjacent to these residential areas and depend on volunteer fire protection districts and limited road networks for evacuation.

Mountain Green Elementary School is located in an area with a wildfire structure exposure score of 5, indicating high risk. All other district facilities are in a moderate-exposure area with a score of 4.

IMPACTS

Wildfire impacts include the following:

- Direct threat to school buildings, outdoor facilities, and bus yards in WUI areas
- Smoke and poor air quality, which can force cancellation of outdoor activities and require adjustments to ventilation strategies, even when fires burn in neighboring counties
- Evacuation and shelter-in-place decisions, and potential use of schools as temporary shelters for evacuated households, which can affect continuity of education
- Injuries or death, including along transportation routes to/from the school district

FLOOD

VULNERABILITIES

Flooding (CPRI 2.75) affects riverine areas along the Weber River and its tributaries, as well as localized pluvial flooding in developed valley bottoms. MSD facilities and key access routes in Morgan City and Mountain Green lie within these valley systems, near rivers, canals, and storm-drainage networks.

Morgan High School and the accompanying sports fields are in the 1% annual chance flood zone, and the northern portion of the property is in the floodway. The MSD bus garage and maintenance buildings are also partially within these zones, with a portion located within the 0.2% annual chance flood hazard area. Morgan Elementary School, Morgan Middle School, and the MSD offices are just outside the mapped hazard area, but roads leading to these facilities are within the hazard area and are potentially vulnerable.

IMPACTS

Flood events may result in the following impacts:

- Damage roads, bridges, and culverts used for bus routes, delaying or preventing access to schools
- Cause localized inundation of school parking lots, fields, and low-lying building areas, leading to temporary closure or costly repairs
- Interrupt water, sewer, and power services that rely on infrastructure crossing flood-prone corridors

HIGH WIND

VULNERABILITIES

MSD facilities include large roof spans, athletic fields, playground equipment, parking lots, and bus yards that may be vulnerable to high wind events. Exterior building components such as roofing materials, windows, signage, fencing, and portable equipment may be susceptible to wind damage. Mature trees located near campuses may increase the risk of falling branches during windstorms. Above-ground power lines serving campuses may also be exposed to wind-related outages.

Students and staff are particularly vulnerable during arrival and dismissal periods, outdoor classes, recess, and athletic events when exposure to flying debris or falling branches is increased. Younger children may be less able to recognize and respond quickly to sudden wind hazards. Students with mobility limitations, sensory sensitivities, or cognitive disabilities may require additional assistance during rapid sheltering or evacuation procedures. Bus transportation operations may also be affected, impacting students who rely on district-provided transportation.

IMPACTS

High wind events may cause roof damage, broken windows, fallen branches, and debris accumulation on school grounds. Power outages may disrupt lighting, heating, ventilation, and air conditioning (HVAC) systems, communications, food service operations, and instructional activities. Falling debris or tree limbs may pose safety hazards during arrival, dismissal, or outdoor activities. While typically short in duration, high wind events may require temporary closures or facility repairs.

HAIL

VULNERABILITIES

School buildings with conventional roofing materials, skylights, and exterior mechanical equipment may be vulnerable to hail damage. District-owned vehicles, including school buses, and outdoor equipment may also be exposed. Athletic fields and landscaping may experience localized impacts during severe hailstorms.

Students participating in outdoor activities during sudden hail events may be at risk of injury. Younger children and students engaged in athletics are particularly vulnerable if protective shelter is not immediately accessible. Staff supervising outdoor areas may need to implement rapid protective actions.

IMPACTS

Hail events may damage roofing systems, siding, windows, and vehicles, potentially resulting in water intrusion and interior damage if repairs are delayed. Insurance claims, repair costs, and temporary service disruptions may occur. Although hail events are typically brief, their financial and operational impacts can be significant.

EROSION

VULNERABILITIES

Erosion risk in the district is associated with steep hillside areas, canyon-adjacent development, and slope instability near school catchment areas. Morgan County mapping indicates that some school facilities are located in areas of slight erosion hazard, and Mountain Green Middle School is exposed to areas of low to moderate landslide susceptibility. Sloped terrain may affect access roads and utility corridors serving campuses.

Students and staff may be affected indirectly if erosion compromises access roads, sidewalks, parking areas, or bus routes. Young children and individuals with mobility limitations may be more vulnerable to trip hazards caused by pavement cracking or ground displacement. Reduced access reliability may affect emergency response times and safe arrival/dismissal operations.

IMPACTS

Erosion may affect road shoulders, sidewalks, drainage systems, and underground utilities serving school sites. Progressive soil movement may contribute to pavement cracking, drainage inefficiencies, or localized access issues. Impacts are generally gradual but may increase maintenance needs and create safety concerns such as trip hazards or reduced emergency access.

LANDSLIDE

VULNERABILITIES

Steep slopes and canyon terrain within parts of Morgan County create localized landslide susceptibility. Mountain Green Middle School is identified within areas of low to moderate landslide susceptibility. Schools located near hillside areas may be indirectly affected by slope instability impacting adjacent infrastructure or access routes.

Students and staff relying on hillside access roads may be vulnerable to transportation disruptions caused by slope movement. Individuals with medical needs, mobility limitations, or dependence on specialized transportation may experience greater hardship if routes are temporarily restricted. Disruptions during school hours may require coordinated shelter-in-place or early dismissal procedures.

IMPACTS

Landslides may disrupt transportation corridors, delay bus routes, or limit emergency access to affected campuses. In rare cases, slope movement could impact utilities or structural elements near vulnerable sites. Even minor slope instability may require mitigation measures, monitoring, or temporary closures of affected areas.

DAM FAILURE

VULNERABILITIES

Although the probability of dam failure is relatively low, multiple MSD facilities are located within mapped dam inundation boundaries for Lost Creek, Echo, and East Canyon Dams. Mountain Green Middle School is identified as vulnerable to failure of the Northwest Dam. Morgan High School, Morgan Elementary School, Morgan Middle School, district offices, and bus garage/maintenance facilities are located within mapped inundation zones associated with upstream dams.

Dam failure poses significant life and safety risks because schools concentrate large numbers of children during the school day. Students may have limited independent evacuation capacity and require structured, staff-led evacuation procedures. Younger students, students with disabilities, and medically dependent individuals may require additional assistance during rapid evacuation. Transportation coordination with parents and guardians would be critical.

IMPACTS

A dam failure event would result in rapid downstream flooding, creating significant life-safety risks for students, staff, and visitors. Impacts could include evacuation needs, facility damage, loss of access routes, and disruption of district operations. Transportation networks and emergency response capacity could be compromised during inundation conditions.

AVALANCHE

VULNERABILITIES

Avalanche hazards are primarily associated with canyon travel corridors and mountainous terrain rather than school building sites. However, district operations rely on transportation corridors such as I-84 and canyon roads that may be subject to avalanche closures during winter storm conditions.

Students and staff commuting from canyon or mountain-adjacent areas may be affected by road closures or travel delays. Students who depend on bus transportation may experience disruptions. Extended closures may disproportionately affect families with limited alternative transportation options or inflexible work schedules.

IMPACTS

Avalanche events may block highways and canyon routes, isolating portions of the district and disrupting student transportation, commute times, and emergency access. Extended closures may delay school operations, bus services, or emergency response. Indirect impacts may include scheduling disruptions and reduced access to essential services.

Population Exposure and Social Vulnerability

MSD's vulnerability is shaped not only by the physical condition of its buildings and infrastructure, but also by the characteristics of the population it serves. Because schools concentrate a large share of Morgan County's children during school hours, it is essential to understand demographic characteristics, health sensitivities, and socioeconomic conditions to evaluate life-safety risk, continuity of operations, and recovery capacity.

- **Children and Youth:** With 30.5% of the county's 13,372 residents under 18, roughly 4,000–4,100 children and teens live in Morgan County, and about 3,181 are enrolled in MSD. This means the majority of local youth are present in MSD facilities on school days, making schools central to life-safety, sheltering, and risk-reduction efforts.
- **Socioeconomic Factors:** Morgan County's median household income of $108,309 and 4.6% poverty rate indicate relatively strong household capacity to prepare for and recover from disasters, but high housing costs and limited rental stock can constrain post-disaster relocation options.
- **Students per Household:** The general plan notes high student-per-household and a small commercial tax base, which contribute to MSD spending the least per student in Utah despite high assessed property values. This financial constraint can limit the district's capacity to fund major mitigation projects without external assistance.

Critical Facilities and Lifelines at Risk

MSD's critical assets include five primary schools (Morgan Elementary, Mountain Green Elementary, Morgan Middle, Mountain Green Middle, Morgan High), two preschools, online education programs, bus garages, and the district office. These facilities depend on the following lifelines:

- **Transportation:** I-84, state routes, canyon roads, and local streets that are vulnerable to snowstorms, landslides, flooding, and post-earthquake damage.

- **Fire and Emergency Medical Services (EMS):** A volunteer county fire department in Morgan City and a separate Mountain Green Fire Protection District, both serving MSD campuses and surrounding neighborhoods.
- **Water and Sewer:** Culinary water from springs and wells in Morgan City and private water companies in unincorporated areas, along with sewer service from Morgan City and the Mountain Green Sewer Improvement District; both systems are sensitive to drought, contamination, and infrastructure damage.
- **Power and Communications:** Morgan City Power and Rocky Mountain Power transmission lines serve most facilities; outages due to wind, snow, wildfire, or earthquakes would affect life-safety systems, heating/cooling, and instructional continuity.

Built Environment and Structures/Land at Risk

MSD structures are primarily located in developed valley bottoms (Morgan City, Mountain Green) surrounded by steep slopes, rivers, and WUI areas. Residential development in these communities has expanded rapidly—the County population grew 72.4% between 2000 and 2020 and is projected to continue growing through 2050. This growth increases the following vulnerabilities:

- Exposure of school campuses to nearby housing and infrastructure that may be damaged or burned, affecting school operations even without direct building damage
- Cumulative stress on water, sewer, and road systems serving schools, especially under drought or heavy-storm conditions
- The number of students and staff who may be impacted by building damage, shelter-in-place, or evacuation orders

Built-environment vulnerabilities for MSD include aging building stock at some campuses, widespread use of hard-surface paving (which can increase pluvial flood runoff), limited redundancy for key facilities (only one high school and limited specialized spaces), and potential exposure of foundations and underground utilities to problem soils.

Changes Since the Last Plan Update

Since the Federal Emergency Management Agency (FEMA)-approved 2021 Pre-Disaster Mitigation Plan, several changes affect MSD vulnerability:

- **Population and Enrollment Growth:** County population has increased to ~13,372 residents, and Morgan District enrollment reached 3,181 students in 2023–24, indicating more people at risk during school hours.
- **Refined Hazard Ranking:** The 2025 risk-assessment update identifies earthquakes and radon as top hazards, with snowstorms, drought, problem soils, wildfire, and flood following closely behind, sharpening priorities for school mitigation investments.

- **Enhanced Climate-Risk Information:** First Street Reports now provide parcel-level estimates of wildfire, flood, heat, and air-quality risk, revealing high exposure of local residents—especially children—to these hazards.
- **Planning and Growth in Mountain Green and Morgan City:** Updated general plans document ongoing residential expansion and infrastructure planning in the school catchment areas, increasing WUI interface and dependency on constrained canyon- and valley-transportation corridors.

Future Vulnerability Considerations

Looking ahead, MSD vulnerability is expected to increase without targeted mitigation due to the following factors:

- **Continued Population Growth:** Projections for Morgan City alone show population rising to nearly 9,900 residents by 2050, with associated growth in student enrollment and development near existing schools.
- **Climate Change:** More frequent rain-on-snow events, earlier snowmelt, prolonged dry periods, and hotter summers will alter flood, drought, wildfire, and air-quality patterns affecting school operations and infrastructure.
- **Aging Infrastructure and Problem Soils:** As buildings and underground utilities age, cumulative impacts from expansive/collapsible soils and repeated hazard events (freeze–thaw cycles, drought, minor floods) will grow, increasing maintenance needs and the likelihood of performance issues during major events.
- **Resource Constraints:** The district's low per-student spending relative to Utah averages, despite high property values, may limit its ability to undertake large capital mitigation projects without external funding or partnerships.

Capability Assessment

MSD's mitigation and resilience capabilities are grounded in its participation in county- and state-level hazard planning, compliance with Utah safety and building regulations, and the day-to-day capacity of district staff to plan, fund, operate, and maintain safe learning environments. Where MSD lacks direct regulatory authority (for example, over land use or floodplain management), it relies on coordination with Morgan County, Morgan City, and state agencies.

Planning and Regulatory

Table 75 summarizes planning and regulatory capabilities for this planning area.

Table 75: Morgan School District Planning Capabilities

Plan/Document	Purpose and Relevance to Hazard Mitigation
Morgan County Pre-Disaster Mitigation Plan (2021 Update)	FEMA-approved multi-jurisdictional hazard mitigation plan that evaluates regional natural hazards, including K–12 education facilities in Morgan City and unincorporated areas; adoption enables participating jurisdictions and their partners to be eligible for FEMA Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance (FMA), and Building Resilient Infrastructure and Communities (BRIC) funding for long-term risk-reduction projects that can benefit MSD facilities and operations.
Morgan County Local Hazard Mitigation Plan Update (in progress)	Current effort to update the 2021 plan; the process explicitly includes special districts and will produce a dedicated MSD annex, helping align district mitigation actions with county and city strategies and funding opportunities.
Morgan County General Plan (most recent update)	Countywide land-use and growth-management framework that guides residential and infrastructure development in unincorporated areas served by MSD; by steering growth and infrastructure away from high-risk areas, it indirectly reduces future hazard exposure of district facilities and bus routes.
Morgan City General Plan Update	Municipal plan that guides development, transportation, and public services in Morgan City, where several MSD campuses and critical routes are located; policies related to floodplains, hillside development, and infrastructure capacity support safer siting and upgrading of school facilities.
Utah Enhanced State Hazard Mitigation Plan	State-level plan that defines mitigation priorities, identifies funding streams, and includes statewide programs for seismic safety, flood-risk reduction, wildfire, and other hazards affecting schools; provides the policy and funding context for MSD's participation in FEMA mitigation programs.
MSD School Emergency Response and Safety Plans (per Utah Code 53G-4-402 and related rules)	School- and district-level emergency response and safety plans required by state law, addressing evacuation, shelter-in-place, communications, and coordination with law enforcement, fire, EMS, and emergency management; while focused on preparedness and response, these plans inform mitigation priorities for safe access/egress, backup power, and protective upgrades to buildings and grounds.

Table 76 summarizes regulatory capabilities for this planning area.

Table 76: Morgan School District Regulatory Capabilities

Policy/Code Name	Code Number (if applicable)	Year	Purpose and Relevance to Hazard Mitigation
Utah Fire Prevention and Safety Act	Utah Code 53-7 (referenced in Utah Enhanced State Hazard Mitigation Plan)	1993	Establishes authority of the State Fire Marshal and local fire officials to enforce fire safety rules on school district property, supporting fire-resistant construction, inspections, and correction of fire hazards in MSD buildings.
Management of Forest Lands and Fire Control	Utah Code 65A-8-1	1993	Provides framework for wildfire prevention and control, including reciprocal fire protection agreements; supports wildfire risk reduction and response around MSD facilities in wildland–urban interface areas.
School Building Earthquake Inspection Program / HB 278S01	State program referenced in Utah Enhanced HMP	2013	Requires school districts seeking bond funds to conduct FEMA 154 rapid visual screening or more detailed seismic studies for pre-1975 school buildings, encouraging identification and prioritization of seismic retrofit needs for MSD's older facilities.
Utah Code 53G-9-601 to 53G-9-607 (Bullying, Cyberbullying, Hazing, Retaliation)	State statutes cited in MSD policy	2019–2020	Requires LEAs to adopt and enforce policies, reporting, training, and data collection related to bullying and hazing; MSD's implementation supports safer, more supportive school climates that reduce stressors and vulnerabilities before and after disasters.
MSD Employee Bullying and Hazing Policy	DLA	Current (aligned with 2019–2020 state law and rules)	District policy defining, prohibiting, and establishing investigation and training requirements for bullying, cyberbullying, hazing, and retaliation toward staff and students, including regular training and annual reporting; this strengthens social cohesion and mental health protections that are important components of overall resilience.

Administrative and Technical

Table 77 summarizes administrative capabilities for this planning area.

Table 77: Morgan School District Administrative Capabilities

Agency/Organization/Partnership	Sector	Role in Hazard Mitigation and Resilience
Morgan School District Board of Education and District Administration	Education/Public Administration	Sets district policy, approves budgets and capital projects, and adopts required emergency and safety plans; provides overall governance for integrating mitigation priorities (e.g., seismic safety, safe routes, indoor air quality) into long-range planning and investments.
MSD Facilities and Maintenance Staff	Facilities/ Operations	Responsible for day-to-day maintenance and repair of school buildings and grounds, coordinating building upgrades, drainage improvements, defensible space around facilities, and compliance with building and fire codes; key implementers of structural and non-structural mitigation measures identified in the county and district plans.
MSD Transportation Staff (School Bus Operations)	Transportation	Manages bus routing, snow and severe-weather procedures, and coordination with county public works and law enforcement; supports mitigation by avoiding high-risk routes where feasible and informing safe access/egress improvements to campuses.
MSD School-Level Administrators and Safety Teams	Education/ Campus Safety	Implement school emergency and safety plans, coordinate drills, maintain emergency supplies, and identify site-specific mitigation needs (e.g., securing contents, relocating portable classrooms away from hazard areas).
Partnerships with Morgan County, Morgan City, and Weber Basin Water Conservancy District	Local Government/ Special Districts	Provide access to hazard data, emergency management expertise, dam and flood information, and potential project partners for mitigation grants, especially for flood, dam failure, and seismic risk affecting school facilities.

Table 78 summarizes technical capabilities for this planning area.

Table 78: Morgan School District Technical Capabilities

Capability	Role in Hazard Mitigation and Resilience
Facilities and maintenance staff with building systems and construction experience	Support identification of building deficiencies, oversee small-scale retrofits (e.g., bracing of non-structural elements, drainage fixes), and coordinate with design professionals for larger seismic- or flood-related upgrades.
Access to county and state GIS and hazard data	Through participation in the county mitigation-planning process, MSD can use updated flood, dam inundation, wildfire, and earthquake hazard maps when planning future facility improvements or siting new buildings.
Information technology capacity	Supports continuity of learning (e-learning, remote operations) during extreme weather, poor air quality, and other disruptions, which reduces the educational and economic consequences of hazard events.
Safety, counseling, and student services staff	Provide training, social-emotional supports, and post-event recovery services that reduce long-term human impacts and help students and staff recover more quickly from disasters or extended disruptions.

Financial

Table 79 summarizes financial capabilities for this planning area.

Table 79: Morgan School District Financial Capabilities

Funding Source	Type (Pre- or Post-Disaster)	Purpose and Relevance to Hazard Mitigation
District Operating and Capital Improvement Budgets	Pre-Disaster	Local property-tax and state-aid revenues used for routine maintenance and capital improvements; primary mechanism for funding code-compliant construction, roof and HVAC replacement, drainage improvements, and other projects that can incorporate mitigation features when planned.
Federal Elementary and Secondary School Emergency Relief (ESSER) I Allocation – $45,892	Post-Disaster (COVID-19 relief)	One-time federal emergency relief funds that MSD could apply (and has experience applying) to eligible facility improvements, technology, and student supports; experience managing ESSER grants demonstrates the district's ability to administer federal funds that may

Funding Source	Type (Pre- or Post-Disaster)	Purpose and Relevance to Hazard Mitigation
		include resilience co-benefits and positions MSD to manage future hazard mitigation grants.[193]
Federal ESSER II Allocation – $184,986	Post-Disaster	Follow-on federal relief funds; while primarily for pandemic recovery, investments such as improving ventilation, technology, and distance-learning capacity can support resilience to wildfire smoke, extreme heat, and other disruptions.[194]
Federal ESSER III Allocation – $416,771	Post-Disaster	Largest tranche of pandemic recovery funds; allowed for multi-year investments and built MSD capacity to plan and manage larger projects and grants—skills that are transferable to FEMA hazard mitigation funding opportunities.[195]
FEMA Hazard Mitigation Assistance Programs (HMGP, FMA – accessible via Morgan County's FEMA-approved Pre-Disaster Mitigation (PDM) Plan	Pre- and Post-Disaster	With Morgan County's PDM plan approved and adopted, local jurisdictions and partners are eligible to pursue FEMA mitigation grants; MSD can work through Morgan County or as a sub-applicant (where allowed) for projects such as seismic retrofits, drainage improvements, safe rooms, and backup power for critical facilities.

[193][193] Ballotpedia, "Elementary and Secondary School Emergency Relief (ESSER) Allocation and Expenditures by District in Utah," https://ballotpedia.org/Elementary_and_Secondary_School_Emergency_Relief_%28ESSER%29_allocation_and_expenditures_by_district_in_Utah.

[194] Ballotpedia, "Elementary and Secondary School Emergency Relief (ESSER) Allocation and Expenditures by District in Utah," https://ballotpedia.org/Elementary_and_Secondary_School_Emergency_Relief_%28ESSER%29_allocation_and_expenditures_by_district_in_Utah.

[195] Ballotpedia, "Elementary and Secondary School Emergency Relief (ESSER) Allocation and Expenditures by District in Utah," https://ballotpedia.org/Elementary_and_Secondary_School_Emergency_Relief_%28ESSER%29_allocation_and_expenditures_by_district_in_Utah.

Education and Awareness

Table 80 summarizes education and awareness capabilities for this planning area.

Table 80: Morgan School District Education and Awareness Capabilities

Capability	Lead Organization	Description
Bullying, Hazing, and Cyberbullying Prevention Training	Morgan School District (MSD)	District policy requires training at least every three years for employees, coaches, volunteers, and students on bullying, cyberbullying, hazing, retaliation, discrimination, and trauma-informed practices; this improves school climate and social resilience before and after disasters.
Annual Student Climate and Safety Assessments	MSD	Schools conduct at least one annual assessment of bullying and hazing prevalence, including identification of "unsafe" locations where additional supervision or environmental design changes may be needed; these assessments can inform mitigation priorities related to campus layout and supervision.
Emergency Preparedness Outreach to Families	MSD (in coordination with local emergency management)	MSD shares safety policies and procedures with families via handbooks and the district website and can coordinate with county and city partners to promote household emergency planning and hazard awareness, reinforcing preparedness beyond the school campus.
Earthquake Drills	MSD (in coordination with Morgan County Emergency Management and local first responders)	MSD conducts regular earthquake drills in accordance with Utah Code and state education guidance, including drop-cover-hold procedures, evacuation protocols, and post-event accountability. These drills improve life-safety readiness for students and staff and reinforce awareness of seismic risk identified as a top hazard in the countywide risk assessment.

National Flood Insurance Program Status

Table 81 summarizes National Flood Insurance Program (NFIP) status for this planning area.

Table 81: Morgan School District NFIP Status[196]

CID	Community Name	County	Initial FHBM Identified	Initial FIRM Identified	Current Effective Map Date	Regular-Emergency Program Entry Date
490093B	Morgan City, City of	Morgan County	06/28/1974	07/16/1987	12/07/2017	07/16/1987
490092B	Morgan County (unincorporated areas)	Morgan County	10/18/1974	09/28/1990	12/07/2017	09/28/1990

- **Flood Zones:** Morgan City and unincorporated Morgan County participate in the NFIP and have mapped Special Flood Hazard Areas (SFHAs) along Cottonwood Creek, East Canyon Creek, and the Weber River, based on updated maps effective December 7, 2017. Several MSD facilities, including Morgan Middle School and Morgan Elementary School, are located near mapped floodplains and rely on surrounding transportation and drainage infrastructure that may be affected during flood events.
- **Floodplain Management Regulations and Compliance:** Floodplain development in areas where MSD facilities are located is regulated by Morgan City and Morgan County through their flood-damage-prevention ordinances and permitting processes; MSD relies on these jurisdictions' floodplain administrators and building officials to review any new construction or substantial improvements affecting school properties. While MSD itself does not administer floodplain regulations, the district coordinates with local floodplain administrators to understand flood risk to existing campuses and to support emergency planning and continuity of operations.
- **Adoption of NFIP Criteria:** Morgan City and Morgan County have adopted NFIP minimum standards as a condition of participation in the program, including requirements for elevating or floodproofing structures in SFHAs, which apply to MSD facilities when they are newly constructed or substantially improved in these zones.
- **Implementation Oversight:** Local enforcement is carried out by county and city staff (e.g., planning, engineering, and building departments); MSD coordinates with them during project planning and permitting to ensure compliance with NFIP-related standards for any affected school facilities.
- **Substantial Improvement/Substantial Damage (SI/SD) Provisions:** SI/SD determinations for MSD buildings are made by Morgan County or Morgan City as part of their NFIP responsibilities; any MSD project in SFHAs that meets SI/SD thresholds would be required to bring the structure into compliance with current floodplain standards

[196] CID: Community Identification Number, FHBM: Flood Hazard Boundary Map, FIRM: Flood Insurance Rate Map, NFIP: National Flood Insurance Program.

- **Repetitive Loss (RL) and Severe Repetitive Loss (SRL) Properties:** No MSD properties are RL or SRL.
- **Community Rating System (CRS) Participation:** Morgan City and Morgan County are not listed among Utah CRS communities in the statewide flood chapter consulted; consequently, MSD's facilities do not currently benefit from CRS-driven premium reductions but could in the future if local jurisdictions join CRS.
- **Regional Coordination:** MSD benefits indirectly from regional flood mapping and mitigation initiatives in the Upper/Lower Weber watershed, including updated FEMA mapping funded in 2011 for Cottonwood Creek, East Canyon Creek, and the Weber River, which inform local planning and floodplain management for the communities where MSD operates.
- **Flood Evacuation Planning for Key MSD Facilities:** Morgan Middle School and Morgan Elementary School, located in Morgan City near Cottonwood Creek and associated drainage corridors, are identified as priority facilities for flood preparedness. MSD emergency and safety plans include site-specific evacuation, shelter-in-place, and parent-notification procedures for flood events, coordinated with Morgan City Emergency Management, public safety agencies, and transportation providers. MSD will continue to review and update flood evacuation routes, reunification procedures, and communication protocols for these campuses in coordination with local floodplain administrators and emergency responders, consistent with FEMA guidance for critical facilities in or near SFHAs.

Opportunities for Improvement

Table 82 identifies opportunities for improvement for this planning area.

Table 82: Morgan School District Opportunities for Improvement

Opportunity Type	Description	Lead Organization
Planning and Regulatory	Formalize integration of MSD's school emergency and safety plans with the updated Morgan County Local Hazard Mitigation Plan by cross-referencing mitigation projects (e.g., seismic retrofits, drainage improvements, backup power) in both sets of documents and ensuring Board-level adoption of the updated MSD annex.	MSD Administration, in coordination with Morgan County Emergency Management
Administrative and Technical	Designate a district-level resilience or safety coordinator to serve as MSD's primary point of contact for hazard mitigation planning, data collection on facility vulnerabilities, and coordination with county, city, and state partners.	MSD Administration

Opportunity Type	Description	Lead Organization
Financial	Work with Morgan County to identify and develop at least one shovel-ready mitigation project (such as structural strengthening of older buildings, drainage improvements, or safe-room features in new construction) that could be submitted for FEMA HMGP, FMA, or BRIC funding following plan approval.	MSD Administration and Facilities, Morgan County Emergency Management
Education and Awareness	Expand community outreach and education efforts to include coordination with parents, faith-based organizations, and other public/community entities; build on existing School Community Councils and emergency committees, and support the district's goal of organizing a full-scale drill that incorporates parents and the broader public.	MSD Student Services and School Administrators
NFIP	Establish a standard procedure that requires consultation of current FEMA Flood Insurance Rate Maps (FIRMs) and coordination with the relevant floodplain administrator before siting new facilities, adding portable classrooms, or undertaking major renovations in areas near Cottonwood Creek, East Canyon Creek, or the Weber River.	MSD Facilities, Morgan County and Morgan City Floodplain Administrators

Mitigation Strategy

Status of Prior Actions

MSD did not have a standalone annex or district-specific mitigation actions in the 2021 Morgan County Hazard Mitigation Plan. The plan addressed school buildings only within the countywide facility inventories.

Table 83 summarizes the status of prior mitigation actions for this planning area.

Table 83: Status of Mitigation School District Actions

Hazard	Mitigation Action Item	Current Status (as of current HMP Update)
All	All	No Morgan School District (MSD)–specific mitigation actions were identified, adopted, or tracked in the 2021 Morgan County Pre-Disaster Mitigation Plan. MSD was referenced only in facility inventories; no district actions were included in the County's action tables.

2026 Mitigation Actions

Table 84 summarizes 2026 mitigation actions for this planning area.

Table 84: 2026 Mitigation Actions for Morgan School District[197]

Action Number	Action Title	Description	Hazard Addressed	Vulnerability	Goals	Lead Agency	Funding Source	Timeline	Priority	In 2021 HMP?
MSD-1	**Enhanced Emergency Communications and Redundancy**	Expand mass-notification systems, install radio repeaters where needed, and provide redundant communication systems for campuses with limited cellular coverage.	Avalanche, Dam Failure, Drought, Earthquake, Erosion, Extreme Cold, Flood, Hail, High Wind, Landslides, Problem Soils, Radon, Snowstorms, Wildfire	Communication gaps in canyon/mountain areas; essential for reunification and evacuation.	Improve response coordination and safety.	MSD Administration; County EM	EMPG; local funds	1–3 years	Medium	No
MSD-2	**Comprehensive Multi-Hazard School Campus Assessments**	Conduct annual hazard assessments of each campus (seismic hazards, WUI proximity, flood routes, accessibility, non-structural hazards); integrate findings	Dam Failure, Drought, Earthquake, Erosion, Extreme Cold, Flood,	Supports long-term planning; required for implementation of district annex.	Strengthen long-term vulnerability reduction.	MSD Safety Teams and Facilities	Local funds	Annual (ongoing)	Medium	No

[197] BRIC: Building Resilient Infrastructure and Communities, CPRI: Composite Risk Index, EM: Emergency Management, EMPG: Emergency Management Performance Grant, EPA: Environmental Protection Agency, FEMA: Federal Emergency Management Agency, FFSL: Utah Division of Forestry, Fire & State Lands, FMA: Flood Mitigation Assistance, HEPA: High-Efficiency Particulate Air, HMGP: Hazard Mitigation Grant Program, HVAC: Heating, Ventilation, and Air Conditioning, MSD: Morgan School District, UDOT: Utah Department of Transportation, WUI: Wildland–Urban Interface.

Action Number	Action Title	Description	Hazard Addressed	Vulnerability	Goals	Lead Agency	Funding Source	Timeline	Priority	In 2021 HMP?
		into capital planning and emergency plans.	Hail, High Wind, Landslides, Problem Soils, Radon, Snowstorms, Wildfire							
MSD-3	**Districtwide Seismic Screening and Prioritized Retrofit Program**	Conduct FEMA 154 Rapid Visual Screening of all MSD buildings (Morgan City and Mountain Green), followed by detailed engineering evaluations for structures built before modern seismic codes; create a districtwide prioritization plan for retrofit or replacement.	Earthquake	High seismic exposure from the Weber Segment of the Wasatch Fault; older buildings may predate current codes.	Life safety; reduce structural collapse risk.	MSD Facilities; contracted structural engineers	FEMA BRIC; HMGP; Capital Improvement Program	1–3 years	High	No
MSD-4	**Backup Power for Critical Facilities (School Shelters and Communications)**	Install backup generators or battery storage at priority campuses (e.g., Morgan High/Middle) used for sheltering or essential operations to maintain heat, lighting, communications, and refrigeration during outages.	Extreme Cold, Snowstorm, Earthquake, High Wind	Frequent winter outages; schools serve as critical facilities; preserves heating and communications.	Maintain essential operations; support community resilience.	MSD Facilities	BRIC; HMGP; Pre-Disaster Capital Funding	2–4 years	Medium-High	No
MSD-5	**HVAC Modernization and Ventilation**	Upgrade HVAC systems to improve cooling capacity, MERV-13 filtration, and ventilation controls; target	Extreme Heat, Wildfire	Heat days increasing (7 → 16 per year by 2050); air quality	Improve indoor air quality;	MSD Facilities	Capital Funds; Inflation Reduction Act school energy	3–6 years	Medium	No

Action Number	Action Title	Description	Hazard Addressed	Vulnerability	Goals	Lead Agency	Funding Source	Timeline	Priority	In 2021 HMP?
	Upgrades for Heat and Air Quality	buildings with aging infrastructure or portable classrooms.		vulnerability for large youth population.	maintain safe temperatures.		programs (where available)			
MSD-6	**Stormwater and Drainage Improvements at Flood-Prone Campuses**	Assess and upgrade drainage at Morgan City and Mountain Green schools; add swales, gutters, and backup drainage to reduce pluvial flooding during high-intensity storms.	Flood, Erosion	About a third (32.2%) of County properties at risk from flooding; campuses located in valley bottoms near waterways.	Reduce facility damage; maintain access.	MSD Facilities; Morgan City and County Engineering	FEMA FMA; Capital Improvement Program	2–5 years	Medium-High	No
MSD-7	**Problem Soils Monitoring and Foundation Protection Program**	Conduct geotechnical evaluations of campuses in areas with expansive/ collapsible soils; implement foundation stabilization, drainage improvements, and preventive maintenance.	Problem Soils, Drought	CPRI 2.95; drought-driven soil shrink/swell can damage structures and utilities.	Protect building longevity and utility systems.	MSD Facilities; geotechnical consultants	Capital Funds	2–5 years	Medium	No
MSD-8	**Districtwide Radon Testing and Mitigation Program**	Perform baseline radon testing in all ground-floor classrooms and occupied spaces; install mitigation (sub-slab depressurization) where levels exceed EPA action level; adopt a five-year re-testing cycle.	Radon	Radon ranked CPRI 3.25; Morgan County EPA Zone 2; chronic exposure risk for students/staff.	Protect life/health; improve indoor air quality.	MSD Facilities	School Capital Funds; EPA radon grants (where eligible)	1–2 years	High	No
MSD-9	**Safe Routes to School Hazard Mitigation Enhancements**	Identify high-risk areas along bus routes and walking zones (steep slopes, icy areas, limited shoulders,	Snowstorms, Landslides, High Wind, Flood	MSD depends heavily on rural transportation; winter storms and	Ensure safe, reliable access/ egress for students.	MSD Transportation; Morgan County Roads; Morgan	UDOT Safe Routes; local road funds	1–5 years	Medium	No

Action Number	Action Title	Description	Hazard Addressed	Vulnerability	Goals	Lead Agency	Funding Source	Timeline	Priority	In 2021 HMP?
		drainage issues); partner with County/Morgan City to implement fixes (shoulders, signage, drainage, guardrails).		slopes disrupt access.		City Public Works				
MSD-10	**Wildfire and Smoke Resilience for Mountain Green and Morgan City Campuses**	Create defensible space where appropriate, upgrade landscaping with fire-resistant materials, install ember-resistant vents, and purchase portable HEPA filtration units for smoke days.	Wildfire	99% of properties exposed; Mountain Green WUI; poor air quality impacts approximately 4,267 youth.	Improve air quality; reduce ignition risk; continuity of operations.	MSD Facilities; Mountain Green Fire Protection District	BRIC; HMGP; Utah FFSL wildfire grants	1–4 years	High	No

Mitigation Actions Implementation and Monitoring

MSD will implement and monitor mitigation actions in coordination with Morgan County Emergency Management, Morgan City, and relevant public-safety partners. The District Administration, in partnership with the Facilities Department and Transportation Department, is responsible for tracking progress on each action listed in the mitigation strategy. Monitoring activities will include at least annual internal reviews of project status, alignment with capital-improvement planning, identification of available funding sources, and coordination with the County for any actions that may be eligible for FEMA Hazard Mitigation Assistance programs (HMGP, FMA). MSD will also document measurable milestones such as engineering assessments completed, grants submitted, and construction projects initiated or finished. Updated action status will be provided to Morgan County for inclusion in the County's annual Local Hazard Mitigation Plan (LHMP) monitoring process and the next full LHMP update cycle.

Plan Integration

Status of Prior Plan Integration

The 2021 Morgan County Pre-Disaster Mitigation Plan did not include an MSD annex, nor did it document any prior district-specific mitigation actions. Integration with MSD was limited to referencing schools as critical facilities within countywide hazard profiles. The plan did not document coordination with MSD capital planning, facility maintenance programs, or school emergency and safety plans. No evidence of formal alignment between the 2021 mitigation plan and MSD capital planning, emergency policies, or operational procedures was identified in the reviewed documents.

Future Plan Integration Methodology

To ensure meaningful integration going forward, MSD will incorporate the mitigation actions and hazard-specific findings from this annex into district operational and capital decision-making. Integration will occur through:

- **Alignment with Capital Improvement Planning:** Hazard-mitigation needs—such as seismic screening, drainage improvements, radon mitigation, and HVAC upgrades—will be incorporated into annual and multi-year capital planning cycles and prioritized using findings from this annex.
- **Coordination with Emergency and Safety Plans:** MSD school safety plans, emergency response procedures, and communications protocols will incorporate hazard information and mitigation projects identified in this annex, including evacuation, reunification, and sheltering considerations.
- **Incorporation into Budget Development:** District Administration will evaluate opportunities to leverage local capital budgets, Utah school-facility funds, and eligible federal mitigation funding in coordination with Morgan County Emergency Management as the FEMA grant applicant.

- **Cross-jurisdictional Review:** MSD will coordinate with Morgan County and Morgan City planning, engineering, and emergency management departments to ensure facility siting, improvements, and new school planning align with local hazard zones, floodplain regulations, and wildfire-interface management.
- **Staff Training and Awareness:** MSD will integrate relevant hazard-specific training (air-quality protocols, wildfire smoke responses, earthquake safety, winter-weather procedures) into staff development cycles and annual safety briefings.

Plan Maintenance

Continued Public Involvement

MSD will work with Morgan County Emergency Management to review progress on mitigation actions no less than annually, consistent with FEMA LHMP monitoring requirements. Public involvement will include the following:

- Posting plan updates, approved mitigation actions, and progress summaries on the MSD website
- Sharing relevant information through school newsletters, board meetings, and district-wide communications
- Making draft updates available for public comment during annual LHMP evaluation cycle
- Inviting parents, students, and community safety partners to participate in workshops or surveys regarding school safety and hazard-related concerns, including drills coordinated with public-safety agencies where feasible

These mechanisms ensure transparency and allow the district community to contribute to long-term resilience priorities.

Monitoring, Evaluating, and Updating the Plan

MSD will work with Morgan County Emergency Management to review progress on mitigation actions at least once per year. This review will document the following:

- Progress toward completion of identified mitigation actions
- Changes in hazard conditions, enrollment, or facilities that affect vulnerability
- Opportunities to incorporate new data, building evaluations, or updated FEMA guidance

A full annex update will occur as part of the next countywide LHMP update cycle—anticipated on a five-year schedule consistent with FEMA requirements. MSD will also update the annex earlier if significant hazard events, new school construction, major facility changes, or substantial changes in district operations occur.