2024 UPDATE TO
MULTI-HAZARD MITIGATION PLAN
FOR
STILLWATER COUNTY, MONTANA
AND
CITY OF COLUMBUS

***Prepared for*:**

Stillwater County Emergency Services
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Prepared by:

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November 2021

Updated by:
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Updated November 2024

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LIST OF ACRONYMS

BCA	Benefit Cost Analysis
BLM	Bureau of Land Management
BRIC	Building Resilient Infrastructure and Communities
CDBG	Community Development Block Grant
CDC	Centers for Disease Control
CDP	Census Designated Place
cfs	Cubic Feet Per Second
CPRI	Calculated Priority Risk Index
CRP	Conservation Reserve Program
CRS	Community Rating System
CWD	Chronic Wasting Disease
CWPP	Community Wildfire Protection Plan
DES	Disaster and Emergency Services
DFIRM	Digital Flood Insurance Rate Map
DHS	U.S. Dept. of Homeland Security
DMA	Disaster Mitigation Act
DNRC	Montana Department of Natural Resources and Conservation
DOI	U.S. Department of Interior
DPHHS	Montana Dept. of Public Health and Human Services
EAP	Emergency Action Plan
EAS	Emergency Alert System
EDA	Economic Development Authority
EMPG	Emergency Management Performance Grant
EOC	Emergency Operations Center
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right to Know Act
FAA	Federal Aviation Administration
FBI	Federal Bureau of Investigation
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FMA	Flood Mitigation Assistance
FMAG	Fire Management Assistance Grant
FP&S	Fire Prevention & Safety
GIS	Geographic Information Systems
HAZUS	Hazards of the United States
HES	High Emissions Scenario
HMGP	Hazard Mitigation Grants Program
IBC	International Building Code
IDSA	Infectious Disease Society of America
IPAWS	Integrated Public Alert and Warning System
IRC	International Residential Building Code
kv	Kilovolt
LEPC	Local Emergency Planning Committee

LIST OF ACRONYMS

LERD	Lands, Easements, Rights-of-way, Relocations, and Disposal
LES	Low Emissions Scenario
LiDAR	Light Detection and Ranging
LOMR	Letter of Map Revision
MACo	Montana Association of Counties
MATIC	Montana All Threat Intelligence Center
MDEQ	Montana Department of Environmental Quality
MDOR	Montana Department of Revenue
MDT	Montana Department of Transportation
MHMP	Multi-Hazard Mitigation Plan
MHP	Montana Highway Patrol
MRL	Montana Rail Link
MSU	Montana State University
NCDC	National Climatic Data Center
NDRP	National Drought Resiliency Partnership
NED	National Elevation Dataset
NFIP	National Flood Insurance Program
NFPA	National Fire Protection Association
NOAA	National Oceanic and Atmospheric Administration
NRIS	Natural Resource Information System (Montana)
NTSB	National Transportation Safety Board
NWS	National Weather Service
PA	Public Assistance
PDM	Pre-Disaster Mitigation
PER	Preliminary Engineering Report
PHEP	Public Health Emergency Preparedness
PPE	Personal Protective Equipment
RFA	Rural Fire Assistance
SC DES	Stillwater County Department of Emergency Services
SHELDUS	Spatial Hazard Events and Losses Database for the United States
SPLC	Southern Poverty Law Center
TRI	Toxic Release Inventory
TSEP	Treasure State Endowment Program
USACE	United States Army Corps of Engineers
USDA	United State Department of Agriculture
USFS	United States Forest Service
USGS	United States Geological Survey
WEA	Wireless Emergency Alerts
WHO	World Health Organization
WRN	Weather Ready Nation
WUI	Wildland Urban Interface
WWTF	Wastewater Treatment Facility

SECTION 1. INTRODUCTION

1.1 Background

In response to requirements of the Disaster Mitigation Act of 2000 (DMA 2000), Stillwater County and the City of Columbus have developed this Multi-Jurisdictional Multi-Hazard Mitigation Plan (MHMP). DMA 2000 amends the Stafford Act and is designed to improve planning for, response to, and recovery from, disasters by requiring state and local entities to implement hazard mitigation planning and develop MHMPs. The Federal Emergency Management Agency (FEMA) has issued guidelines for development of MHMPs. The Montana Disaster and Emergency Services (DES) supports plan development for jurisdictions in the State of Montana.

> ***Hazard Mitigation*** is any sustained action taken to reduce or eliminate the long-term risk and effects that can result from specific hazards.
>
> FEMA defines a ***Hazard Mitigation Plan*** as the documentation of a state or local government evaluation of natural hazards and the strategies to mitigate such hazards.

Stillwater County completed and adopted a Pre-Disaster Mitigation (PDM) Plan in 2010 to help guide and focus hazard mitigation activities. The original PDM Plan was updated in 2015. Stillwater County, working together with Tetra Tech Inc., has prepared this 2021 MHMP update to satisfy the requirement that hazard mitigation plans be updated every five years. Stillwater County Department of Emergency Services (SC DES) updated the MHMP in November 2024. The updated Stillwater County MHMP profiles significant hazards to the community and identifies mitigation projects that can reduce those impacts. The purpose of the updated MHMP is to promote sound public policy designed to protect residents, critical facilities, infrastructure, private property, and the environment from natural and man-made hazards. The updated Stillwater County MHMP includes resources and information to assist residents, organizations, local government, and others interested in participating in planning for natural and man-made hazards. This 2021 updated MHMP supersedes the 2010 and 2015 PDM Plans. This plan will be added as an appendix to the 2025 Regional MHMP in order to maintain the accuracy and quality of the Stillwater County MHMP.

1.2 Authority

The 2021 and 2024 update to the Stillwater County MHMP has been developed pursuant to the requirements in the Interim Final Rule for hazard mitigation planning and the guidance in the State and Local Plan Interim Criteria under DMA 2000. The Plan also meets guidance developed by FEMA in March of 2013 for Local Mitigation Planning. This MHMP in conjunction with the 2024 Regional MHMP meets the FEMA Local Hazard Mitigation Planning Policy Guidance FP 206-21-0002.

The Stillwater County Board of County Commissioners have adopted this MHMP and approved the updated Plan being added as an appendix to Addendum U of the Eastern Montana Hazard Mitigation Plan. Also adopting the Plan is the incorporated community of Columbus. These governing bodies have the authority to promote sound public policy regarding natural and man-made hazards in their jurisdictions. Copies of the signed resolutions are included in **Appendix A**. The MHMP was adopted at the regularly scheduled County Commission and City Council meetings, which were open to the public and advertised through the typical process the jurisdictions use for publicizing meetings.

Stillwater County will be responsible for submitting the adopted MHMP to FEMA for review. Upon acceptance by FEMA, Stillwater County and the incorporated community of Columbus will remain eligible for mitigation project grants and post-disaster hazard mitigation grant projects.

1.3 Acknowledgements

Many groups and individuals have contributed to the development of the Stillwater County MHMP. Stillwater County provided support for all aspects of plan development including providing digital locations and insurance values for the critical facilities and infrastructure used in the MHMP analysis. The MHMP Planning Team, comprised of various members of the Local Emergency Planning Committee (LEPC), planning officials from municipal departments, state and federal partners, first responders, and other community members, met on a regular basis to guide the project, identify the hazards most threatening to Stillwater County, developed and prioritized mitigation projects, reviewed draft deliverables and attended the public meetings. Other local community members participated in the planning process by attending public meetings and contributed to development of the MHMP by reviewing and commenting on the draft Plan.

1.4 Scope and Plan Organization

The process followed to prepare the 2021 Stillwater County MHMP update included the following:

- Review and prioritize disaster events that are most probable and destructive,
- Identify and update critical facilities,
- Identify and update areas within the community that are most vulnerable,
- Identify and update goals for reducing the effects of a disaster event,
- Identify and update projects to be implemented for each goal,
- Identify and update procedures for monitoring progress and updating the MHMP,
- Review the draft MHMP, and
- Adopt the updated MHMP.

The MHMP is organized into sections that describe the planning process (Section 2), community profile (Section 3), risk assessment (Section 4), mitigation strategies (Section 5) and plan maintenance (Section 6). Appendices containing supporting information are included at the end of the plan.

SECTION 2. PLANNING PROCESS

The 2021 and 2024 updated Stillwater County MHMP is the result of a collaborative effort between Stillwater County, the incorporated community of Columbus, utilities, local agencies, non-profit organizations, businesses, and regional, state and federal agencies. The 2021 planning effort was facilitated by the contractor, Tetra Tech and the 2024 update was completed by SC DES. Public participation played a key role in the development of goals and mitigation projects, as outlined below. For the purposes of this planning effort, the public is defined as residents of Stillwater County, local departments, state and federal partners that support activities in the county, neighboring communities and local organizations.

The planning process for the Stillwater County MHMP took place between January and December 2021, during the COVID-19 pandemic. All non-essential travel was discouraged to slow the spread of the virus and as such, all coordination for this project took place through conference calls and virtual meetings. The 2024 update was completed between October and November 2024.

2.1 MHMP Planning Team

The Stillwater County DES Coordinator requested that members of the stakeholders group serve as the MHMP Planning Team for the purposes of updating the Plan. Volunteers were solicited from the stakeholder group and invited to attend the various meetings and workshops in accordance with their expertise. Individuals who attended Planning Team meetings are listed in **Appendix B-1**. The affiliation of these participants is presented in **Table 2.1-1.**

Table 2.1-1. Agencies Represented on the MHMP Planning Team

Organization / Department / Position	Type of Organization
Stillwater County / Commissioners	County Government
Stillwater County / Disaster and Emergency Services / Coordinator	County Government
Stillwater County / Community & Economic Development / Director	County Government
Stillwater County / Floodplain Administrator & Sanitarian	County Government
Stillwater County / Geographic Information Systems	County Government
Stillwater County / Road and Bridge Dept.	County Government
Stillwater County / Sheriff's Office / Undersheriff	County Government
City of Columbus / Fire & Rescue / Chief	City Government
City of Columbus / Fire & Rescue, Rural Fire District	City Government
Absarokee / Sewer District	Sewer District
Park City / Volunteer Rural Fire District	Rural Fire District
Stillwater-Billings Clinic / Public Health	Medical
Sibanye-Stillwater Mining Company	Business
U.S. Bureau of Land Management / Fire Officer	Federal Land Management Agency
U.S. Forest Service / Fire Officer	Federal Land Management Agency
National Weather Service / Warning Meteorologist	Federal Agency
Montana Rail Link Railroad	Railroad
Beartooth Electric Cooperative	Utility

Responsibilities of the Planning Team included attending video conference calls to discuss update of the Plan, providing data for analysis in the risk assessment, attending virtual public meetings, providing input and feedback on mitigation strategies, reviewing the draft MHMP, and supporting the Plan throughout the adoption process. The MHMP Planning Team will assist SC DES in updating the Plan in the future.

The MHMP Planning Team had several video conference calls over the course of the project, as detailed below.

- **February 22, 2021** – Score hazards using Calculated Priority Risk Index and determine priorities including which hazards should be profiled in the 2021 MHMP.
- **March 8, 2021** – Review and update critical facilities and hazard impact area maps.
- **April 13, 2021** – Mitigation strategy workshop on the Wildfire hazard.
- **April 19, 2021** – Mitigation strategy workshop of the Flooding, Dam Failure, Severe Weather, Drought and Landslide hazards.
- **May 10, 2021** – Mitigation strategy workshop on the Communicable Disease, Hazardous Material Incident, Transportation Accident, Terrorism/Violence/Civil Unrest, and Cyber Security hazards.
- **May 24, 2021** – Mitigation strategy workshop on the All Hazard goal. Capability assessment plan maintenance, and future development discussion.

In advance of each video conference call, an agenda and/or materials to be discussed (i.e. hazard maps, hazard ranking matrices, example mitigation strategies, etc.) were emailed to meeting participants and were posted on the project website. Planning Team conference call notes are presented in **Appendix B-4**.

2.2 Project Stakeholders

The planning process was initiated by preparing a stakeholders list of individuals whose input was needed to help prepare the MHMP. Planning partners on the stakeholders list received a variety of information during the project including invitations to participate in Planning Team meetings, public meeting notices, documents for review, and the draft mitigation strategy. **Appendix B-1** presents the stakeholders list for this project.

On the county level, project stakeholders included the County Commissioners, County Attorney, DES Coordinator, Sheriff's Office, Road and Bridge Department, Floodplain Administrator, Planning/Community and Economic Development Director, Geographic Information Systems (GIS), Environmental Health, Clerk and Recorder, Finance, Superintendent of Schools., and County Extension. These entities participated in the planning process by either providing data, attending Planning Team and/or public meetings or reviewing the draft MHMP.

Stakeholders from the City of Columbus included: the Mayor, City Council members, Floodplain Administrator, Public Works Department, Planning and Zoning, Police, Clerk-Treasurer, and City Court. These entities participated in the MHMP update by either providing data, attending Planning Team and/or public meetings or reviewing the draft Plan.

Stakeholders from the unincorporated communities included representatives from the Absarokee Sewer District, and the Absarokee, Molt, Nye, Park City, and Rapelje volunteer fire departments. These entities participated in the MHMP update by either attending Planning Team and/or public meetings or reviewing the draft Plan.

Stakeholders from federal agencies included representatives from: the National Weather Service, Stillwater Conservation District, Bureau of Land Management (BLM), and U.S. Forest Service (USFS). These agencies participated in the MHMP update by providing data, attending Planning Team and/or public meetings, and/or reviewing the draft MHMP.

Stakeholders from state agencies included representatives from: Montana DES, Montana Highway Patrol, Montana Department of Transportation, and Montana Department of Natural Resources and Conservation (DNRC). These entities participated in the planning process by providing data, attending Planning Team and/or public meetings, and/or reviewing the draft MHMP.

Non-governmental stakeholders included non-profit and local organizations, utilities, the healthcare community, and other businesses. These entities included representatives from Sibanye-Stillwater Mining Company, CHS Pipelines and Terminal, Montana Rail Link, Beartooth Electric Co-op, Liftt, Stillwater County News, Stillwater-Billings Clinic, Beartooth Manor Nursing Home, the American Red Cross, and Service Dogs. Several of these entities provided data, attended Planning Team and/or public meetings, and reviewed the draft MHMP update.

Planning partners from adjoining jurisdictions included: the Carbon, Golden Valley, Park, Sweet Grass and Yellowstone County DES Coordinators. These entities did not offer input on the Stillwater County MHMP update.

2.3 Review of Existing Plans and Studies

At the initiation of the project, planning documents, regulations, and studies completed for Stillwater County and the City of Columbus, and the region were obtained from relevant websites and/or provided by the DES office. Documents were reviewed in order to determine how hazard mitigation is integrated into local land use planning, ordinances, and programs. Contributing plans, regulations, and studies reviewed by the contractor included:

DAMS

- Emergency Action Plan, Mystic Lake Dam

FLOODPLAIN STUDIES

- Flood Insurance Study, Stillwater County and Incorporated Areas, 2015

GROWTH POLICIES, ORDINANCES & REGULATIONS

- Stillwater County Growth Policy, 2018
- Stillwater County Subdivision Regulations, 2017
- Stillwater County Capital Improvements Plan, 2020
- City of Columbus Growth Policy, 2012

HAZARD MITIGATION

- Stillwater County Pre-Disaster Mitigation Plan, 2015
- Stillwater County Community Wildfire Protection Plan (CWPP)

Data obtained from the plan and regulation review was incorporated into various sections of the MHMP. A summary of land use implementation tools is presented in *Section 3.7.1*. *Section 4.0* contains reference to the plans and ordinances affecting hazard management and future development. *Section 6.3* includes a discussion on how mitigation can be implemented through existing programs.

2.4 Project Website

A website was set up at the start of the project to provide information to the Planning Team, project stakeholders and the citizens of Stillwater County. The project website can be viewed at: www.MTmitigation.com/ (password: Columbus). The website remained active during the course of the project through adoption of the Plan.

The website contained a Home page and pages for: Contacts, Planning Team, Meetings, Draft MHMP, Maps, and Resources. The Home page contained a letter inviting to public to participate in development of the MHMP. The Contacts page contained information on Tetra Tech and County personnel involved in management of the project. The Planning Team page contained the meeting schedule, agendas, handouts, and notes from Planning Team meetings. The Meetings page contained the public meeting schedule, notes, handouts and presentations from the public meetings. The Draft MHMP page contained sections from the draft plan for stakeholder review. The Maps page contained draft versions of the critical facility and hazard maps prepared for the project. The Resources page contained the 2015 Stillwater County PDM Plan, FEMA guidance on preparing multi-jurisdictional hazard mitigation plans, the FEMA Region 8 Plan Review Guidance dated September 2011, FEMA Mitigation Ideas Handbook dated January 2013, FEMA Local Mitigation Planning Handbook dated March 2013, and links to the State of Montana Multi-Hazard Mitigation Plan and FEMA websites.

2.5 Project Meetings

Two online public meetings were conducted during development of the MHMP using the MS Teams Platform. The first public meeting was held to kick-off the project. At this meeting, the 2015 Stillwater County PDM Plan was reviewed and hazard events over the past six years were discussed. The second public meeting was held to review the draft risk assessment and mitigation strategy and to kick-off the public review period for the draft MHMP. Since the meetings were held online, collecting signatures from those in attendance on a sign-in sheet was not feasible. Instead, meeting attendance was documented on the meeting notes. As individuals joined the online meeting, they introduced themselves, and their names and affiliation were recorded. Documentation is presented in **Appendix B-3.**

The first virtual public meeting was held on January 25, 2021. A meeting notice was sent via e-mail to all project stakeholders, posted on the project website, on the county's Facebook page, and advertised in the Stillwater County News newspaper. During this meeting, Tetra Tech made a presentation which reviewed and analyzed each section of the 2015 Stillwater County PDM plan, outlined the background and rationale for updating the Plan, the process and methodology for the update, and the project schedule. **Table 2.5-1** describes the outcome of the 2015 PDM Plan review.

Table 2.5-1. Review and Analysis of 2015 Pre-Disaster Mitigation Plan

2015 PDM Sections	How Reviewed and Analyzed
Section 1 - Introduction	Reviewed existing section through discussion at kick-off meeting. No analysis needed.
Section 2 – Planning Process	Identified new and emerging hazards to include in updated Plan. Outlined planning process for Plan update to include public meetings, planning team conference calls, project website, and plan review process.
Section 3 – Community Profile	Reviewed existing section through discussion at Planning Team meetings. Updated sections on demographics, critical facilities, and land management tools.
Section 4 – Risk Assessment and Vulnerability Analysis	Reviewed and analyzed existing section through discussion during kick-off meeting and Planning Team conference calls. Scored hazards using Calculated Priority Risk Index. Reviewed and updated critical facility data. Updated and created new hazard area impact maps. Reviewed, updated and created new hazard profiles incorporating data on recent events. Completed new risk

Table 2.5-1. Review and Analysis of 2015 Pre-Disaster Mitigation Plan

2015 PDM Sections	How Reviewed and Analyzed
	assessment, including discussion on Unexpected Weather Event for each hazard. Included hazard composite map and evaluation of future development.
Section 5 – Mitigation Strategy	Reviewed during Planning Team conference calls. New projects developed, existing projects re-worded and/or deleted, completed projects documented. Identified implementation details including responsible dept., progress made, planned activities, potential funding sources, and proposed schedule. Updated information on funding sources. Included new section on Capability Assessment.
Section 6 – Plan Maintenance	Reviewed and analyzed existing section through discussion during kick-off meeting and Planning Team conference calls. Determined that plan maintenance procedures outlined in previous plan were implemented but not documented.

The meeting presentation was subsequently placed on the project website for stakeholders who could not attend the meeting (**Appendix B-3**). Twenty-six (26) individuals attended the public meetings including the Stillwater County Commissioners, Sheriff's Office, County DES, County Planning/Economic Development, County Road and Bridge, County Extension, County Floodplain Administrator, County Environmental Health, County Clerk and Recorder, Columbus Police Dept., Columbus Fire & Rescue, Columbus Clerk-Treasurer, Park City Volunteer Rural Fire District, Absarokee Sewer District, Montana DES, the National Weather Service, U.S. Forest Service, Bureau of Land Management, Stillwater-Billings Clinic, Sibanye-Stillwater Mining Company, CHS Pipelines and Terminals, and Beartooth Electric Co-op.

A second virtual public meeting to review the draft MHMP was held on October 5, 2021. A notice of the meeting was sent via email to the project stakeholders, advertised in the September 29, 2021 edition of the Stillwater County News newspaper, via social media, and posted on the project website. Thirteen (13) individuals attended the meeting including Stillwater County DES, the Board of County Commissioners, County Road and Bridge, County GIS, Columbus Fire Chief, and representatives from the Stillwater-Billings Clinic, U.S. Forest Service, BLM, and Sibanye-Stillwater Mining Company. Meeting notes and the Plan Review presentation are included in **Appendix B-3**. The meeting presentation was also placed on the project website for those who were unable to attend the meeting. Meeting notification documentation is presented in **Appendix B-2**.

2.6 Plan Review

The planning process for the MHMP began on January 6, 2021 and lasted approximately 11 months. The public was provided at least two opportunities for comment prior to adoption of the plan. The first opportunity was during the drafting process. A notice regarding availability of the draft MHMP was published in the Stillwater County News newspaper, posted on the project website, posters hung in public places, and the notice was posted on the county's Facebook page. The notice indicated the Plan was available in hard copy at the Stillwater County DES office, electronically on a flash drive upon request, or available on the project website. An e-mail announcement was sent to the project stakeholders with instructions on how to comment on the draft MHMP.

The draft document was produced with line numbers to aid in the review process. Reviewers were asked to submit their comments on the draft plan to the Stillwater County DES Coordinator after a review period of approximately 30 days (October 1 to November 1, 2021). Comments received from this review were addressed in a plan revision (final draft) which was submitted to Montana DES and FEMA for review and concurrence.

At this point a second opportunity was provided to the public to comment. The final draft plan was posted on the project website and stakeholders were notified of its availability via an e-mail for a second review from December 1, 2021 to February 1, 2022, an approximate 60-day review period. Any final comments were addressed, and the final version of the Plan was provided to the Stillwater County Commissioners and the Columbus City Council for adoption. After adoption, copies of the resolutions were submitted to Montana DES and FEMA.

Future comments on the MHMP should be addressed to:

David Stamey, Chief
Stillwater County Department of Emergency Services
P.O. Box 795
Columbus, MT 59019
(406) 290-8871

SECTION 3. COMMUNITY PROFILE

This section of the MHMP presents an overview of Stillwater County, the community of Columbus, and the unincorporated communities within the county. Information is provided on the characteristics of the county, the economy and land use patterns, and presents the backdrop for this mitigation planning process. The Stillwater County Growth Policy (CTA, 2018), City of Columbus Growth Policy (2012), and Stillwater County PDM Plan (Tetra Tech, 2015) provided many of the details presented in this section.

3.1 Physical Setting

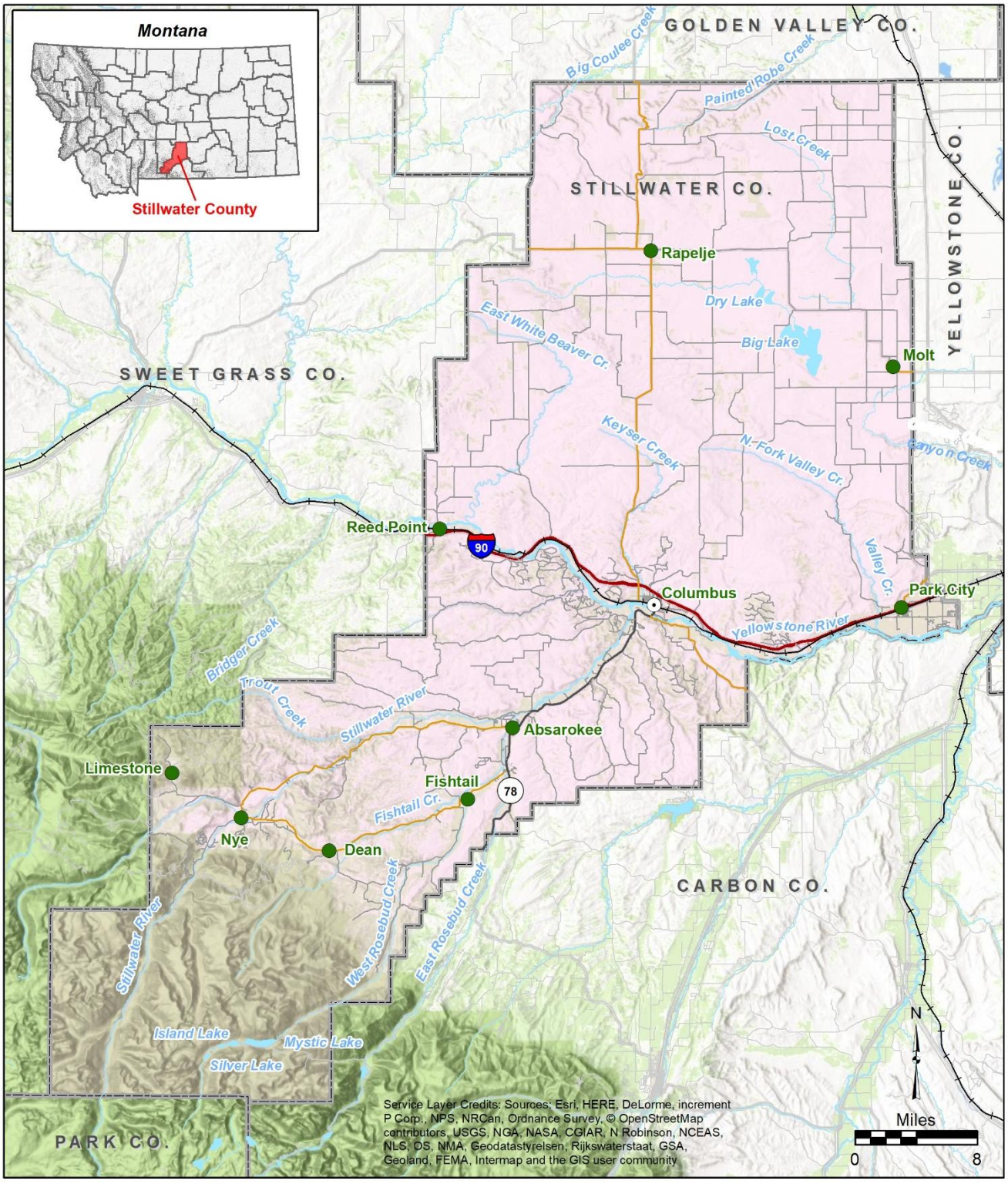
Stillwater County is located in south-central Montana and consists of 1,793 square miles with geographic features that range from the Beartooth Mountains at the southern end of the county, to the Stillwater and Yellowstone River Valleys in the central section, to the lake basins and coulees at the northern end. Columbus is the county seat and the only incorporated community in the county. Unincorporated communities include Absarokee, Dean, Fishtail, Molt, Nye, Park City, Rapelje, and Reed Point. Stillwater County is bounded by Sweetgrass County on the west, Yellowstone County on the east, Carbon and Park Counties on the south, and Golden Valley County on the north. **Figure 1** presents a location map of Stillwater County.

The Beartooth Mountains are located in the southern part of the county on the Custer National Forest. This glaciated landscape has the greatest local variation in relief within the county. Elevations range from 5,000 to 12,000 feet above sea level within a 10-mile distance. The Stillwater River Valley is below 5,000 feet near Nye; the Stillwater Plateau and Fishtail Plateau are around 10,000 feet; Mount Hague, Mount Wood, and Pyramid Mountain all exceed 12,000 feet. Foothills are located between the Beartooth Mountains and Fishtail Creek. These foothills were shaped by unconsolidated sediments derived from glacial out-wash and range in elevation from 5,000 to 7,000 feet.

Painted Robe and Big Coulee are prominent topographic features in the northern-most part of Stillwater County. Elevations in these coulees are below 4,000 feet. These drainages flow northward into the Musselshell River.

The Yellowstone River Valley is the most prominent topographic feature in the central section of the county and flows in a southeasterly direction. The river cuts through relatively steep cliffs and broad alluvial terraces. The Yellowstone River valley is below 4,000 feet in elevation and widths range from several hundred feet to more than a mile. The Stillwater River and the Rosebud Creek drainages are two major tributaries of the Yellowstone River in this area. These tributaries flow northeast from the southern portion of the county. The Reed Point, Springtime, Columbus, Flaherty Flat, and Park City areas are examples of alluvial terraces along the Yellowstone River valley.

A significant part of the county is classified as eroded uplands. The eroded uplands are mostly rolling, dissected, sandstone and shale strata at elevations around 4,000 to 5,000 feet. Shale is less resistant to erosion than sandstone and forms steep sandstone cliffs at various locations. Examples of the eroded uplands topography are in northern Stillwater County and the central part of the county along the Yellowstone and Stillwater River valleys.



Date: 7/27/2021

Legend

County Seat | Interstate | Secondary Road | Stream
Town | Primary Road | City-County Road | Lake
Railroad | Other Road | County Boundary

Figure 1
Location Map
Stillwater County, Montana
Multi-Hazard Mitigation Plan

The lake basins in the northern part of the county are confined and poorly drained depressions containing temporary lakes that vary in size annually. The largest basin in the county, Lake Basin, lies in a northwest to southeast direction between Rapelje and Molt. Lake Basin is around 4,000 feet in elevation. Hailstone Basin and Wheat Basin are also located in this area.

The Stillwater Complex is located in the southern part of the County on the north slopes of the Beartooth Mountains. This formation contains the largest known platinum and palladium reserves in the United States. Sibanye-Stillwater Mining Company has been mining platinum group metals in the Stillwater Complex since 1986. The company conducts mining operations at its Stillwater mine where a concentrating plant upgrades ore to a concentrate. The company operates a smelter, refinery and laboratory in Columbus.

Private land in Stillwater County accounts for 77.7 percent of the total. Other lands in the county are managed by federal and state agencies. The federal government manages approximately 17.7 percent of the total land in Stillwater County including portions of the Custer National Forest (193,240 acres), BLM land (5,514 acres) and two reserves (Halfbreed Lake and Hailstone) within the C.M. Russell National Wildlife Refuge (5,333 acres) administered by the U.S. Fish and Wildlife Service. The State of Montana manages 4.2 percent of the acreage within Stillwater County. Lands managed by the Montana DNRC Trust Lands Management Division account for 45,449 acres, and Montana Fish, Wildlife and Parks manage 2,681 acres.

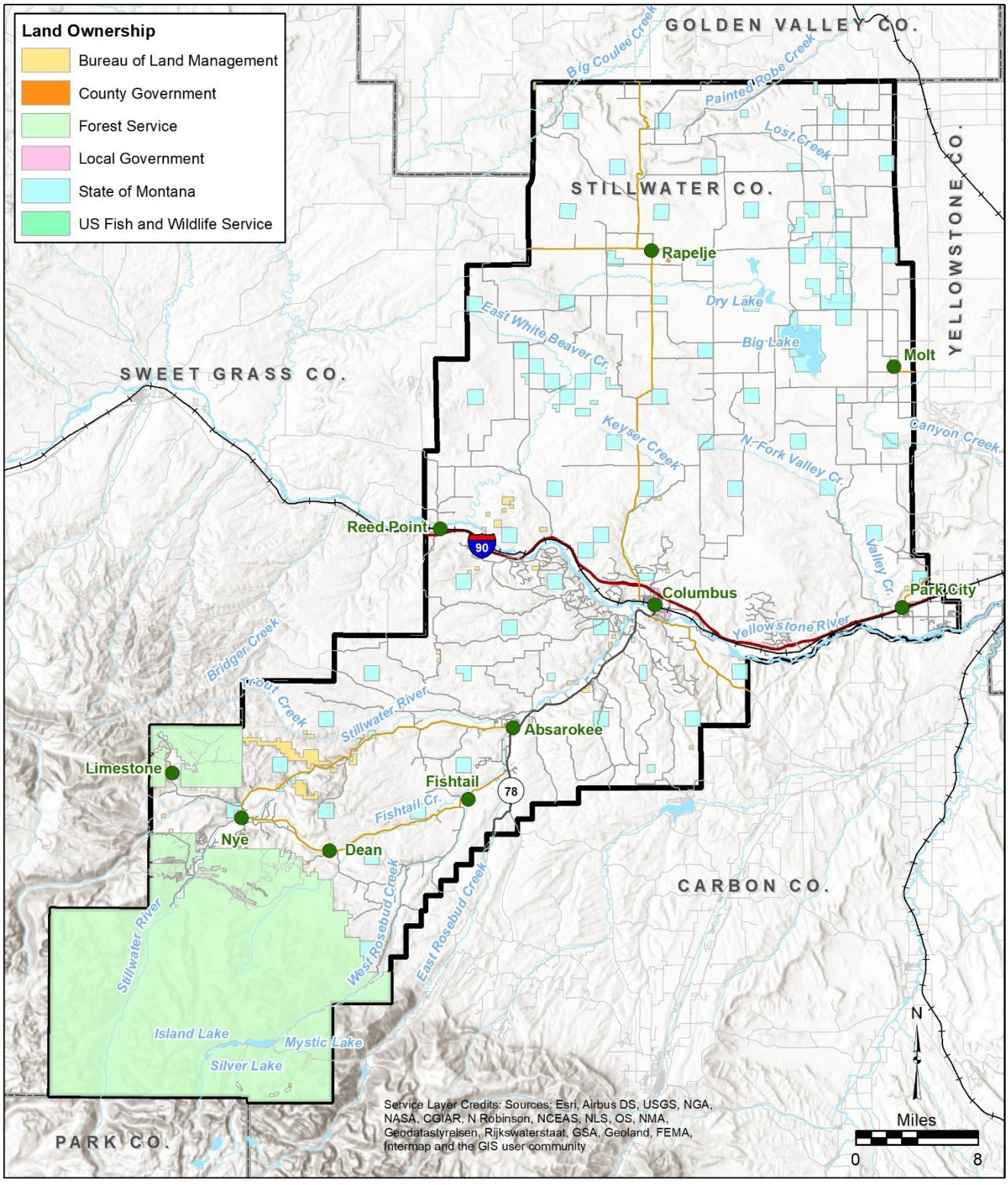
Figure 2 presents the landownership in Stillwater County. Population density in Stillwater County is 5.05 persons per square mile compared to the average 7.0 persons per square mile for the State of Montana, as shown on **Figure 2A.**

3.2 Climate

Stillwater County is located in a climatic region described as semiarid, which is characterized by cold, dry winters; cool, moist springs; hot, moderately dry summers; and cool, dry autumns. Mean annual precipitation ranges from 12-14 inches in the Yellowstone River valley and northern Stillwater County, 14-20 inches in the Stillwater River valley and foothills, and 20 to >70 inches in the Beartooth Mountains. Nearly all precipitation in the winter is snowfall. Snowfall is estimated to reach accumulated totals over 200 inches in the mountains and less than 30 inches in the lower elevations.

The greatest volume of river flow occurs during the spring and early summer months with the melting of the winter snowpack. Heavy rains falling during the spring thaw constitutes a serious flood threat. Ice jams, which occur during the spring breakup, usually in March, cause backwater flooding. Flash floods, although limited in scope, are probably the most numerous and result from locally heavy rainstorms in the spring and summer.

Stillwater County is located in a belt of westerly winds. This predominately westerly flow changes in the spring months when intrusions of moist air from the Gulf of Mexico are brought in by an easterly flow. April, May and June precipitation accounts for nearly 50 percent of the annual average. Winds are predominately from the west. Mean wind speed is around 10 mph. However, wind gusts in excess of 60 mph occur. Severe storms are not common; however, thunderstorms, hailstorms, high winds, heavy snow, freezing rain and sleet do occur.

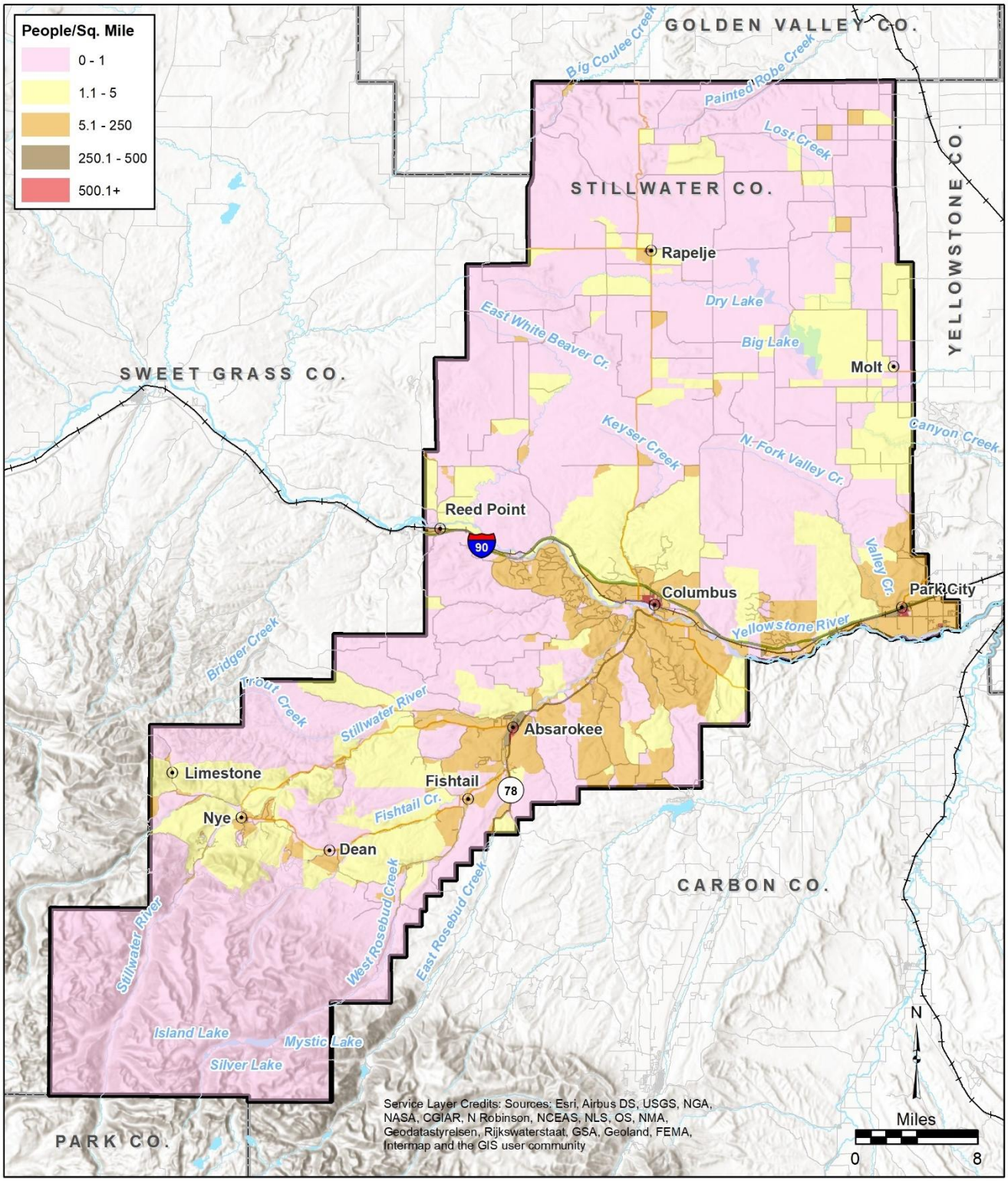


Date: 7/28/2021

Legend

Town | Interstate | Secondary Road | Stream
Railroad | Primary Road | City-County Road | Lake
Other Road | County Boundary

Figure 2
Land Ownership
Stillwater County, Montana
Multi-Hazard Mitigation Plan



Date: 7/30/2021

Legend

Town | Interstate | Secondary Road | Stream
Railroad | Primary Road | City-County Road | Lake
Other Road | County Boundary

Figure 2A
Population Density
Stillwater County, Montana
Multi-Hazard Mitigation Plan

Average monthly temperatures in Stillwater County range from over 60° F in the summer to around 20° F in the winter. Daily temperatures can vary substantially, summer high temperatures can exceed 100 ° F while arctic air in winter can lower temperatures below -30° F. Temperature can also change very rapidly; "Chinook" winds can raise winter temperatures 40 to 50 degrees within a day. Elevation and aspect also play a role in temperature patterns. Climate statistics for the City of Columbus are presented in **Table 3.2-1**.

Table 3.2-1. Stillwater County Climate Statistics – Columbus

Category	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average High (°F)	39	43	52	61	70	78	87	86	75	62	47	37
Average low (°F)	11	15	23	30	39	46	52	49	40	31	20	11
Avg. Precipitation (Inches)	0.57	0.63	1.06	1.90	2.71	2.21	1.21	0.91	1.23	1.30	0.62	0.54
Average Snowfall (Inches)	7	7	8	3	2	0	0	0	1	3	4	8

Source: https://www.usclimatedata.com/climate/columbus/montana/united-states/usmt0072

For the purposes of this mitigation plan, weather is of interest when it threatens property or life and thus becomes a hazard. The National Weather Service (NWS) provides short-term forecasts of hazardous weather to the public and records weather and climatic data. Further information on NWS weather warning criteria is presented in the individual hazard profiles in *Section 4.0*.

Unexpected Weather Event

Unexpected Weather Event will affect the people, property, economy and ecosystems of Stillwater County in a variety of ways. The most important effect for the development of this plan is that Unexpected Weather Event could have a measurable impact on the occurrence and severity of natural hazards. In 2017, the Montana Climate Assessment was published (Whitlock, Cross, Maxwell, Silverman, and Wade, 2017) and explored how future projected Unexpected Weather Event would affect agriculture, forestry and water resources to better plan for the future.

From 1950 to 2006, Stillwater County observed 3 days above 95 degrees each year. According to both emission scenarios, Stillwater County is projected to see 17 to 20 days above 95 degrees annually by mid-century. By the end of the century, the county is projected to see 19 more days above 95 degrees annually according to the LES, and 51 more days above 95 degrees according to the HES.

Between 1950 and 2006, Stillwater County observed an average 1.8 days with more than 1-inch of precipitation. By mid-century, the county is projected to see between 0.8 and 1.0 fewer days with 1-inch precipitation according to both emission scenarios. At the end of the century, the county is projected to see 1.3 fewer 1-inch precipitation days according to the LES, and 0.3 fewer 1-inch precipitation days according to the HES.

Unexpected Weather Event indicators provide useful information about what is occurring in complex systems. These indicators include temperature and growing season, rainfall intensity, snowpack, streamflow, stream temperature, wildland fire occurrence, plants live cycle events, and forest health. The hazard profiles in *Section 4* provide Unexpected Weather Event implications as they relate to hazard mitigation.

3.3 Critical Facilities and Infrastructure

Critical facilities are of particular concern because they provide essential products and services that are necessary to preserve the welfare and quality of life and fulfill important public safety, emergency response, and/or disaster recovery functions. Critical facilities include but are not limited to 911 emergency call centers, emergency operations centers, police and fire stations, public works facilities, sewer and water facilities, communication sites, hospitals, and shelters. Critical facilities also include those facilities that are vital to the continued delivery of community services or have large vulnerable populations. These facilities may include buildings such as the courthouse, the detention center, law enforcement center, public services buildings, senior centers, juvenile services building and other public facilities such as hospitals and schools. Critical facilities in Stillwater County are identified in **Appendix C-2** and further discussed in *Section 4*.

A summary of municipal infrastructure from the Stillwater County Growth Policy (2018) and Columbus Growth Policy (2012) is presented below.

3.3.1 Water and Wastewater Services

The City of Columbus has a public water system consisting of several wells, storage tanks and reservoirs, cast iron pipes and hydrants, a pump house, and chlorination plant. Absarokee and Rapelje also have central water systems. About 1,200 people are being served by these community water systems. The remaining people in the county are served by individual water systems including wells, springs or cisterns.

Absarokee, Columbus, Park City and Reed Point currently have public sewer systems. Over 2,000 people or about 25 percent of the County's population are being served by these community sewer systems. The remaining people are served by individual septic systems.

3.3.2 Utilities

Four companies currently provide electrical service to Stillwater County including NorthWestern Energy, Beartooth Electric, Yellowstone Valley Electric Co-op and Fergus Electric. Fergus Electric provides the electrical service for the Big Coulee area in the northern part of the county. Yellowstone Valley Electric Co-op provides electrical service for eastern portions of the county along the Yellowstone County line in the rural Park City and Molt areas. Beartooth Electric provides electrical service in rural areas of the county from Rapelje to Nye and the Fishtail area. NorthWestern Energy serves Absarokee, Columbus, Reed Point, Park City, the Stillwater Mine and some of the rural areas. The only power generating plant in the county is located at Mystic Lake in southern Stillwater County.

Several major transmission lines and substations are located in the county. There are two 500 kilovolt (kv) power lines across northern Stillwater County. There is also a 230 kv line, a 161 kv line, and a 100 kv line running north/south through the county from the 161 kv line north of Columbus. Substations are located west of Columbus and south of Absarokee.

The primary heating fuel used in Stillwater County is natural gas provided through underground pipeline infrastructure by NorthWestern Energy and Montana Dakota Utilities. Some properties use propane, fuel oil, or wood as heat sources.

3.3.3 Transportation

Interstate 90 (I-90) is the main east-west route through Stillwater County. This four lane divided highway was completed in 1973 and is maintained by the Montana Department of Transportation (MDT). The towns of Columbus, Park City and Reed Point are located along I-90. Each of these communities is served by an

interchange. There is another interchange at Springtime, 8 miles west of Columbus, and a ranch access between Springtime and Reed Point. Average daily traffic on I-90 ranges from approximately 10,000 near Reed Point to over 15,000 near Park City. Approximately 20 percent of the traffic is commercial truck traffic.

State highways include Highway 78 between Columbus and Red Lodge, Highway 10 an east-west route between Park City and the Springtime interchange, Highway 302 east of Molt serving north Stillwater County, Highway 306 between Columbus and Rapelje, Highway 419 between the junction with Highway 78 south of Absarokee and Nye, Highway 420 an east-west collector in southern Stillwater County, and Highway 421 between Columbus and Joliet.

County roads which are major collectors include: the Molt-Rapelje Road, Big Timber Road west of Rapelje, Columbus-Molt Road, Springtime-Svenson-Trees Roads serving the Reed Point area, Countryman Creek Road, Shane Creek Road, Whitebird Creek Road, and the West Rosebud Road.

Bridges

There are over 30 major bridge structures in Stillwater County. MDT maintains the bridge structures on I-90, Highway 10, Rapelje Road 306, Nye Road 419, Stillwater River Road 420 and Joliet Road 421. The Stillwater County Road and Bridge Department is responsible for maintaining bridges on county roads. A few of these have clear span of 20 feet or less. A bridge levy is assessed against property in the county for this purpose. The county also participates in the state off system bridge replacement program and is active in applying for state grant funds for bridge replacement.

Stillwater County has a proactive bridge improvement program and a long-term commitment to capital improvement planning. Bridge standards were formally adopted in 2002 to address bridge demolition and rehabilitation, hydrology, bridge and large culvert design. Many of the smaller wooden bridges have been replaced with culverts. As of this date, all but three major bridges have been replaced to conform with the adopted standards.

Railroads

Burlington Northern Santa Fe (BNSF) operates the rail system through Stillwater County. The main rail line parallels the Yellowstone River east-west through the county and communities of Columbus, Park City and Reed Point. Passenger rail services were discontinued in Stillwater County in the 1980's. BNSF operates a transload facility in Park City.

Airport

Stillwater County has a small airport serving primarily single-engine aircraft located south of Columbus. The airport is city/county owned and is located within the town limits. The closest commercial service airport is in Billings.

3.3.4 Fire and Emergency Services

The provision of fire, ambulance, law enforcement, 911 services and DES are the community services most directly related to the health, safety, and welfare of the public. Stillwater County relies heavily on volunteer fire and ambulance departments and operates under severe budget constraints. The size of the county itself directly impacts the ability to maintain an acceptable level of emergency services in the face of highly dispersed growth. Several of these entities are described below.

Emergency 911 Services

The role of public safety (911) communications in emergency services has changed significantly in the last 20 years requiring emergency communications centers to acquire sophisticated equipment and advanced training for their staff. In Stillwater County, municipal and county public safety agencies are supported through a fully consolidated 911 dispatch center, managed by the Sheriff's Office, for all responders in the county. Calls for emergency services are processed, and multi-agency responses more easily coordinated through this center. The number of calls for service continues to rise, as does the need for emergency medical services, likely due to the aging population in the county.

Fire Services

Fire protection in Stillwater County is handled through a combination of rural fire districts and fire departments. Currently, all the departments and districts operate with paid or volunteer firefighters. The County Commissioners appoints a County Fire Warden who acts as the liaison between the Commission and the fire districts. In Stillwater County, there are four rural fire districts: Absarokee, Broadview, Columbus, and Park City. The Broadview district includes an area in Stillwater County. In addition, there are seven volunteer fire departments or companies including Absarokee, Broadview, Columbus Rural, Molt, Park City, Rapelje, and Nye.

The chief or a representative from each department attends rural fire council meetings as needed, but at least quarterly. The County Fire Warden is a member of the County Fire Council, and acts as a liaison between the Fire Council and the Board of County Commissioners. Written mutual aid agreements have been signed among and between all fire districts or departments in the county, as well as with Sweet Grass, and Carbon counties, and similar agreements have been reached with state and federal fire control agencies. The departments within the county also participate in the state mutual aid program.

Disaster and Emergency Services

Stillwater County emergency management comes under the Department of Emergency Services (SC DES). The mission of the Stillwater County Department of Emergency Services is to reduce the loss of life and property and protect the citizens and visitors of Stillwater County through a comprehensive, all hazards, emergency management program of prevention, protection, mitigation, response, and recovery. The Department of Emergency Services provides guidance to field operations personnel and overall command and control during large-scale emergencies and county-wide disasters. Stillwater is a member of the Eastern Montana Mutual Aid Agreement, which allows for exchange of resources across the region.

Stillwater County has a full-time Chief and part-time deputy who plan, organize, and manage the county Emergency Preparedness Program; evaluate, improve, and promote comprehensive disaster planning efforts; organize and facilitate effective operations of multi-jurisdiction, multi-discipline work groups and task forces; promote interagency coordination; and develop and review polices, contracts, and interagency agreements. These efforts are designed to enhance the capacity of the local government to plan for, respond to, and mitigate the consequences of threats and disasters using an all-hazards framework.

3.4 Population Trends

Stillwater County is the 25th most populous in Montana (out of 56 counties) with a population of 9,177, according to 2022 U.S. Census estimates. **Table 3.4-1** illustrates the change in population in Stillwater County compared to the United States and State of Montana between 1970 and 2019.

Table 3.4-1. County, State and National Population Trends

Year	Stillwater Co. Population	% change from previous census	State of Montana Population	% change from previous census	United States Population	% change from previous census
2019 est.	9,642	5.76%	1,068,144	7.96%	330,150,668	6.48%
2010	9,117	11.25%	989,415	9.67%	308,745,538	9.71%
2000	8,195	25.38%	902,190	12.91%	281,424,602	13.15%
1990	6,536	16.76%	799,065	1.57%	248,709,873	9.79%
1980	5,598	20.85%	786,690	13.29%	226,542,199	11.43%
1970	4,632	-16.18%	694,409	2.91%	203,302,031	13.37%

Source: U.S. Census Bureau, 2021.

Table 3.4-2 presents population statistics for the Town of Columbus and the three Census Designated Places (CDPs) in Stillwater County. CDPs represent several of the unincorporated towns (Absarokee, Park City, and Reed Point). Columbus is the 53rd largest city in Montana, with a population of 2,194 in 2019, a 15.9 percent increase since the 2010 census

Table 3.4-2. Stillwater County Community Population Trends

Incorporated Community /CDP	1980	% Change Since Last Census	1990	% Change Since Last Census	2000	% Change Since Last Census	2010	% Change Since Last Census	2019 Est.	% Change Since Last Census
Absarokee CDP	--	--	1,067	--	1,234	15.65%	1,150	-6.81%	1,061	-7.74%
Columbus, town	1,439	22.68%	1573	9.31%	1,748	11.13%	1,893	8.30%	2,194	15.90%
Park City CDP	--	--	--	--	870	--	983	12.99%	813	-17.29%
Reed Point CDP	--	--	--	--	185	--	193	4.32%	307	59.07%

Source: U.S. Census Bureau, 2021. Notes: CDP = Census Designated Place; -- = data not available.

3.5 Housing Stock

The U.S. Census estimates that in 2019, Stillwater County had 4,866 housing units. The median value of the occupied housing units was $255,500. A further breakdown of the housing units from the census is presented in **Table 3.5-1.**

Table 3.5-1. U.S. Census Housing Data – 2019 Estimates; Stillwater County

Category		Stillwater County	Columbus (Town)
Total Number of Housing Units		4,866	884
Median Value Housing Units		$276,500	$185,600
Year Structure Built			
	2014 or later	142	34
	2010 to 2013	191	16
	2000 to 2009	855	121
	1990 to 1999	811	127
	1980 to 1989	625	113
	1970 to 1979	581	141
	1960 to 1969	302	19
	1950 to 1959	330	64
	1940 to 1949	308	58
	1939 or earlier	721	191

Source: U.S. Census Bureau, 2021. Notes: "-"= data not available.

Stillwater County and Columbus continue to grow their housing stock; however, at a slower pace than during the 1970, 1980s, and 1990s when a large percentage of homes were built in the county to accommodate employees of the Stillwater Mine.

3.6 Economy

Commercial trade, manufacturing, precious metals processing, and tourism are the economic base of Stillwater County. Columbus, the county seat, serves as a shipping center for surrounding farm and ranch lands.

The principal economic activities in Stillwater County for employment include farm and agricultural services, mining, manufacturing, services and professional, construction and government. The largest employer in Stillwater County is Sibanye-Stillwater, which operates a platinum and palladium mine in the Beartooth Mountains and is one of the top 20 employers in the state. Other major employers in the county include Montana Silversmiths, Beartooth Healthcare Community, Columbus IGA Plus, Next FX Pyrotechnics, Special K Ranch, Stillwater Billings Clinic, and Town Pump.

Stillwater County has strong economic ties with Billings, which is a major retail and service center for Montana. Many Stillwater County residents are employed in Billings or Laurel, especially Park City residents. Stillwater County residents also find it convenient to shop in Billings due to short distances and a variety of urban amenities. Health care is available in Stillwater County, but a variety of highly specialized health care and advanced medical technology is also available in Billings.

Tourism also plays an important role in Stillwater County's economy with the Beartooth Absaroka Wilderness Area, Stillwater and Yellowstone River valleys, and the County's Big Lake Complex.

Stillwater County also contains wind resources, generally located in the northwest portion of the county. Stillwater Wind LLC has a 80 MW wind farm north of Reed Point. Puget Sound Energy is building a wind farm with nearly 90 turbines, that will be completed in 2025.

Table 3.6.1 presents economic indicators for Stillwater County and the City of Columbus in 2019.

Table 3.6-1. Stillwater County 2019 Economic Indicators

Indicator	State of Montana	Stillwater County	Columbus (town)
Per capita income	$32,625	$32,301	$27,916
Median household income	$70,804	$78,380	$64,038
Persons living below poverty level	12.6%	6.0%	8.1%

Source: U.S. Census Bureau, 2021.

Per capita personal income in Stillwater County is $32,301, almost equal to that for the State of Montana, while per capita income in Columbus is below the state average. The U.S. Census Bureau estimates that 6.0 percent of the county population is living below the poverty level compared to 12.6 percent for the State of Montana.

3.7 Land Use and Future Development

The mix of public and private land use in Stillwater County is projected to remain relatively constant with 78 percent in private ownership. However, private land use is changing as agricultural land and some timberland is converted to tract land through the subdivision activity in Stillwater County. There was a decline in lands classified agricultural by more than 10,000 acres from 1997 to 2004. This trend is expected to continue to meet the demand for residential properties. Commercial, industrial and other higher density development is projected to remain concentrated in existing town sites with available infrastructure capacity.

Concern has been expressed in resident surveys and community forums about land use conflicts. The trend is to find a balance between property rights and regulating new developments that conflict with existing uses. Examples of land use conflicts include manufacturing plants using flammable or explosive materials locating next to dryland crops, or pre-1976 mobile homes locating near custom built homes.

According to the Stillwater County Overall Economic Development Plan (2015), 291 subdivisions were filed in Stillwater County between 1997 and 2014. Most of the subdivisions were filed in the Columbus area (107), followed by Absarokee and Southern Stillwater County (86), the Park City area (73), and Northern Stillwater County-Reed Point (25).

3.7.1 Land Use Implementation Tools

Industrial, commercial, and residential land use is managed with zoning and subdivision regulations in accordance with guidelines set forth in the county and city growth policies. These documents recognize natural hazards and require regulations to ensure safe growth. Building codes also play an important role to ensure structures are built to minimum safety standards.

Growth Policies

A growth policy is not a regulation; rather, it is an official statement of public policy to guide growth and change. The goals and objectives included in a growth policy provide a basis for the policies and regulations implemented by a county or city. Any directions given in a growth policy are general guidelines to follow and are not intended to be specific and inflexible. Stillwater County's most recent growth policy is dated 2018. The Town of Columbus adopted a Growth Policy in 2012. A Neighborhood Planning Addendum to the Stillwater County Growth Policy was completed in 2010.

The County incorporated the 2015 PDM Plan into the 2018 revision of the Stillwater County Growth Policy (2018). The growth policy recognizes that some lands have inherent public safety issues as well as being environmentally sensitive and susceptible to impacts from natural hazards. Conditions that relate to public health and safety include but are not limited to disease control and prevention; environmental health; flooding,

fire or wildfire hazards, rock falls or landslides, unstable soils, steep slopes, and other natural hazards; high voltage lines or high-pressure gas lines; and air or vehicular traffic safety hazards. Adverse effects of subdivisions on public health and safety may be mitigated by designs that mitigate potential public health and safety issues which may include detailed studies by qualified professionals. The county subdivision regulations provide guidance on development in these areas.

The 2010 Neighborhood Planning Addendum to the Stillwater County Growth Policy includes input from many of the incorporated towns in the county. Specific to the natural hazards, residents in Nye were concerned about wildfire. SC DES Office of the Fire Warden coordinates Fire Safe Stillwater. This workgroup serves to coordinate fuels mitigation programs and provide education to citizens.

The City of Columbus Growth Policy (2012) states that floodplains, areas with high ground water, fire hazard areas, steep slopes, unsuitable soils, earthquakes and severe weather are unsuitable for subdivisions. Some areas may be unsuitable for building or residential purposes, unless the hazards can be mitigated by design.

Zoning Regulations

Zoning is a tool used by local government to control and direct land use in communities, in order to protect the public health, safety and welfare. Zoning ordinances regulate where future growth should or should not be allowed (e.g., which areas of the county are most suitable for development as well as least suitable due to issues such as floodplains, seasonal high groundwater, steep slopes and wildland urban-interface areas.)

Stillwater County currently has one citizen initiated zoning district on the West Fork of the Stillwater River and according to the 2018 Growth Policy, has received petitions and inquiries about creating other planning and zoning districts. This trend may continue in the absence of land use controls, so it may be beneficial for the county to begin evaluating regulatory options now to avoid addressing issues on a case-by-case basis. The county also has zoning regulations for commercial use and multi-family dwellings which were adopted August 10, 2021.

The City of Columbus has adopted zoning ordinances. Details of these regulations, as appropriate, are presented in the hazard profiles in *Section 4*.

Subdivision Regulations

In contrast to zoning which regulates how existing lots may be used and developed, subdivision regulations govern the division of raw land into building lots. They typically identify areas with physical limitations that may not be suitable for development unless the hazards are eliminated or will be overcome by approved design and construction techniques.

Stillwater County and the City of Columbus control development through the use of subdivision regulations that were adopted in 2017. The regulations ensure that all subdivisions are designed so that potentially significant adverse impacts to public health and safety can been avoided or reasonably minimized, specifically:

- Subdivisions proposed in areas identified as a high fire hazard area by a fire district, department, company, or state or federal agency are considered to have adverse effects on public health and safety.
- Portions of subdivisions or associated improvements proposed within a 100-year floodplain as defined in the Stillwater County Floodplain Regulations and by Flood Insurance Rate Maps are considered to have potential adverse effects on public health and safety.
- Subdivisions proposed for mobile home parks or recreational vehicle parks in areas subject to high winds greater than 60 miles per hour are considered to have potential adverse effects on public health and safety.

The Stillwater County and City of Columbus subdivision regulations also promote development in harmony with the natural environment. Among other things, adverse impacts to the natural environment include:

- Any portion of subdivisions or associated improvements proposed within a 100-year floodplains. Also, subdivisions containing riparian areas, or adjacent rivers, streams, lakes or other natural surface water.
- Subdivisions or associated improvements proposed on land with evidence of soils with building or site development limitations, or on landslides or slopes greater than 25 percent.

The regulations allow subdivisions to be built when adverse effects on the natural environment are mitigated by designs that incorporate mitigation measures proposed by state or federal agencies or site-specific mitigation measures based on detailed scientific studies.

Building Codes

Building codes are also a tool to control future development. The main purpose of building codes are to protect public health, safety and general welfare as they relate to the construction and occupancy of buildings and structures. They comprise a set of rules that specify the minimum acceptable level of safety for buildings and often contain requirements for roof construction associated with snow and wind loads. Building codes are generally intended to be applied by architects and engineers, but are also used by building inspectors. Building codes are in effect for commercial building in the Town of Columbus and enforced by the State. Stillwater County does not administer a building code program for the areas outside of Columbus. Montana has adopted the International Building Code.

Floodplain Regulations

The purpose of floodplain regulations is to protect the watercourses and their flood storage areas, as well as the public health, safety, and welfare. Montana state law requires local governments to adopt and enforce floodplain management regulations. It is in the public interest to manage regulation of flood prone lands and waters in a manner consistent with sound land and water use management practices which will prevent and alleviate flooding threats to life and health and reduce private and public economic losses.

Stillwater County has adopted floodplain regulations by resolution and the Town of Columbus has adopted floodplain regulations by ordinance. Floodplain regulations are amended periodically to stay current with statutory amendments or other relevant changes. Floodplain regulations are enforced through the floodplain administrator in Stillwater County. The County, as well as the Town of Columbus participate in the National Flood Insurance Program.

3.7.2 Future Development

Future development in Stillwater County will include a significant number of new residences to serve an increasing population. The County Planning Office reviews an average of seven subdivision and 25 exemption requests each year, resulting in an average of 26 new lots created by subdivision and 11 new tracts created by exemption each year. The Columbus and Park City areas typically experience the most subdivision activity, with over 12 new lots on average being created per year in Park City, and over 7 in Columbus. Absarokee sees an average of over 4 new subdivision lots per year. Future development in Stillwater County will also occur to serve additional mining activity.

Some areas in Stillwater County may be unsuitable for development because of flooding, landslides or rock falls, unstable soils, or steep slopes, as detailed in this MHMP. According to the Stillwater County Overall Economic Development Plan (2015), areas of the county most likely to see future development include:

- Columbus and Park City interchange areas of Interstate-90 (I-90) where new travel plazas and motels may be built.
- Reed Point as a potential site for another I-90 auto/truck plaza.
- Rapelje Rd near the Interstate 90 interchange
- Areas along the paved highways and the BNSF Railroad at Park City, Reed Point, and Columbus.

MHMP Planning Team members indicated the following future development projects are in the planning stages in Stillwater County:

- Large subdivisions in the Park City area.
- New Park City School (parcel acquired on southeast end of town).
- Park City Fire Station Expansion.
- Columbus Fire Station Expansion.
- Nye Fire Hall Addition.
- Continued wind development in Springtime area.
- Electrical substation outside of Park City.
- Burch Creek Energy – Solar Farm.

Section 4.10 presents a hazard analysis of the proposed future development projects in Stillwater County.

SECTION 4. RISK ASSESSMENT AND VULNERABILITY ANALYSIS

Stillwater County is exposed to many hazards both natural and man-made. A risk assessment and vulnerability analysis were completed to help identify where mitigation measures could reduce loss of life or damage to property in Stillwater County and the community of Columbus.

This section includes a description of the risk assessment methodology and hazard profiles for eight hazards organized from high to low by county priority: wildfire, severe summer weather and drought, severe winter weather, flooding and dam failure, landslides, communicable disease, hazardous material incidents and transportation accidents, and terrorism/violence/civil unrest/cyber security incidents. The section is concluded with a risk assessment summary and discussion on the location of future development projects with respect to a composite of the hazard impact areas. Supporting documentation is presented in **Appendix C**.

4.1 Risk Assessment Methodology

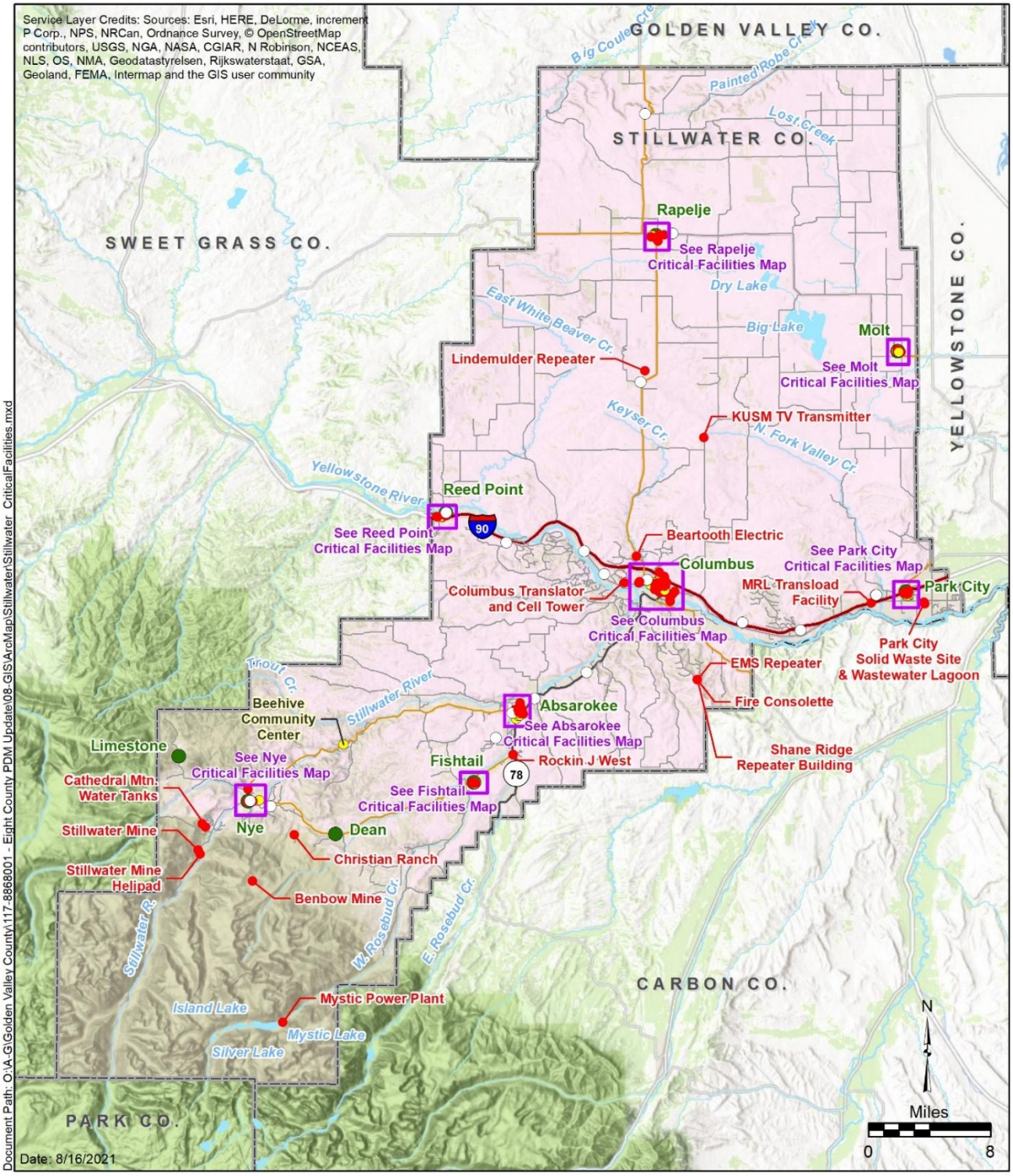
A risk assessment was conducted to address requirements of the DMA 2000 for evaluating the risk to Stillwater County from natural and man-made hazards. DMA 2000 requires measuring potential losses to critical facilities and property resulting from natural hazards by assessing the vulnerability of these facilities to natural hazards. In addition to the requirements of DMA 2000, the risk assessment approach taken in this study evaluated risks to vulnerable populations and also examined the risk presented by several man-made hazards. The goal of the risk assessment process is to determine which hazards present the greatest risk and what areas are the most vulnerable to hazards.

The risk assessment approach used for this plan entailed using GIS software and data to develop vulnerability models for people, structures and critical facilities, and evaluating those vulnerabilities in relation to mapped hazard locations. This type of approach to risk assessment is dependent on the detail and accuracy of the data used during the analysis. Additionally, some types of hazards are extremely difficult to model. Data limitations are described in *Section 4.1.7*.

4.1.1 Critical Facilities and Building Stock

Critical facilities and infrastructure, including bridges, water/wastewater facilities, and communication sites were included in the MHMP analysis. Mapping of these facilities, provided by Stillwater County, allowed for the comparison of their location to the hazard impact areas. Critical facility and infrastructure values were obtained, where readily available, from municipal departments and insurance companies. Replacement values for privately-owned critical facilities was obtained from the Montana Department of Revenue's (MDOR) Cadastral Mapping Program. Some values were estimated based on values of similar facilities. Construction type of critical facilities (e.g. steel, wood, masonry, etc.) has not been compiled and was therefore not considered in the analysis. This data should be collected for future updates of this plan.

Figures 3 and 3A through 3E present the location of critical facilities in Stillwater County, Columbus, Absarokee, Nye and Fishtail, Rapelje and Molt, and Park City and Reed Point, respectively.



Legend

- Critical Facility
- Vulnerable Population
- Cell Tower
- Town
- Interstate
- Primary Road
- Secondary Road
- City-County Road
- Stream
- Lake
- County Boundary

Figure 3
Critical Facilities
Stillwater County, Montana
Multi-Hazard Mitigation Plan

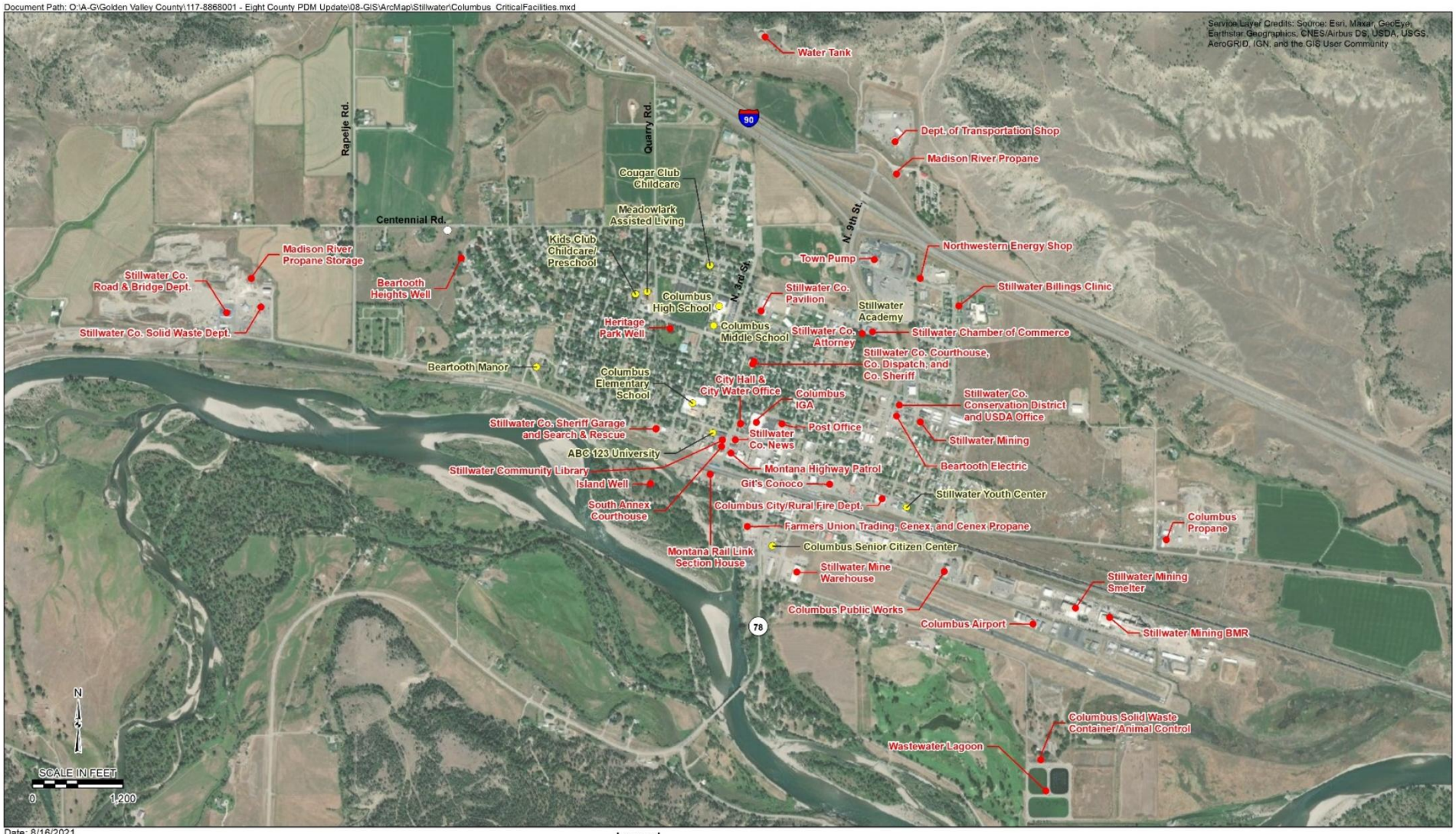


Figure 3A
Columbus Critical Facilities
Stillwater County, Montana
Multi-Hazard Mitigation Plan

Legend

- Critical Facility
- Vulnerable Population
- Cell Tower

Figure 3B
Absarokee Critical Facilities
Stillwater County, Montana
Multi-Hazard Mitigation Plan

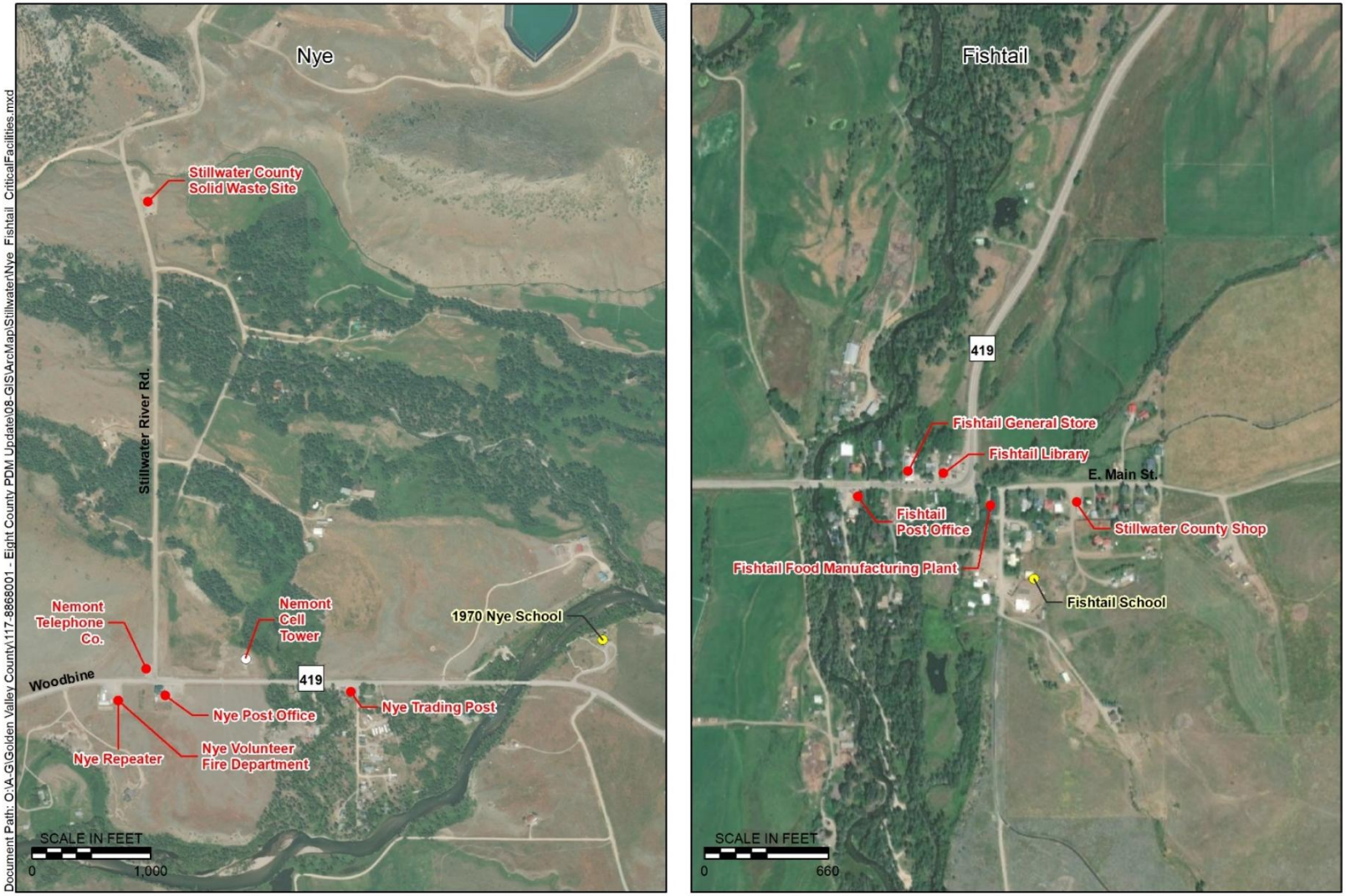


Figure 3C
Nye and Fishtail Critical Facilities
Stillwater County, Montana
Multi-Hazard Mitigation Plan

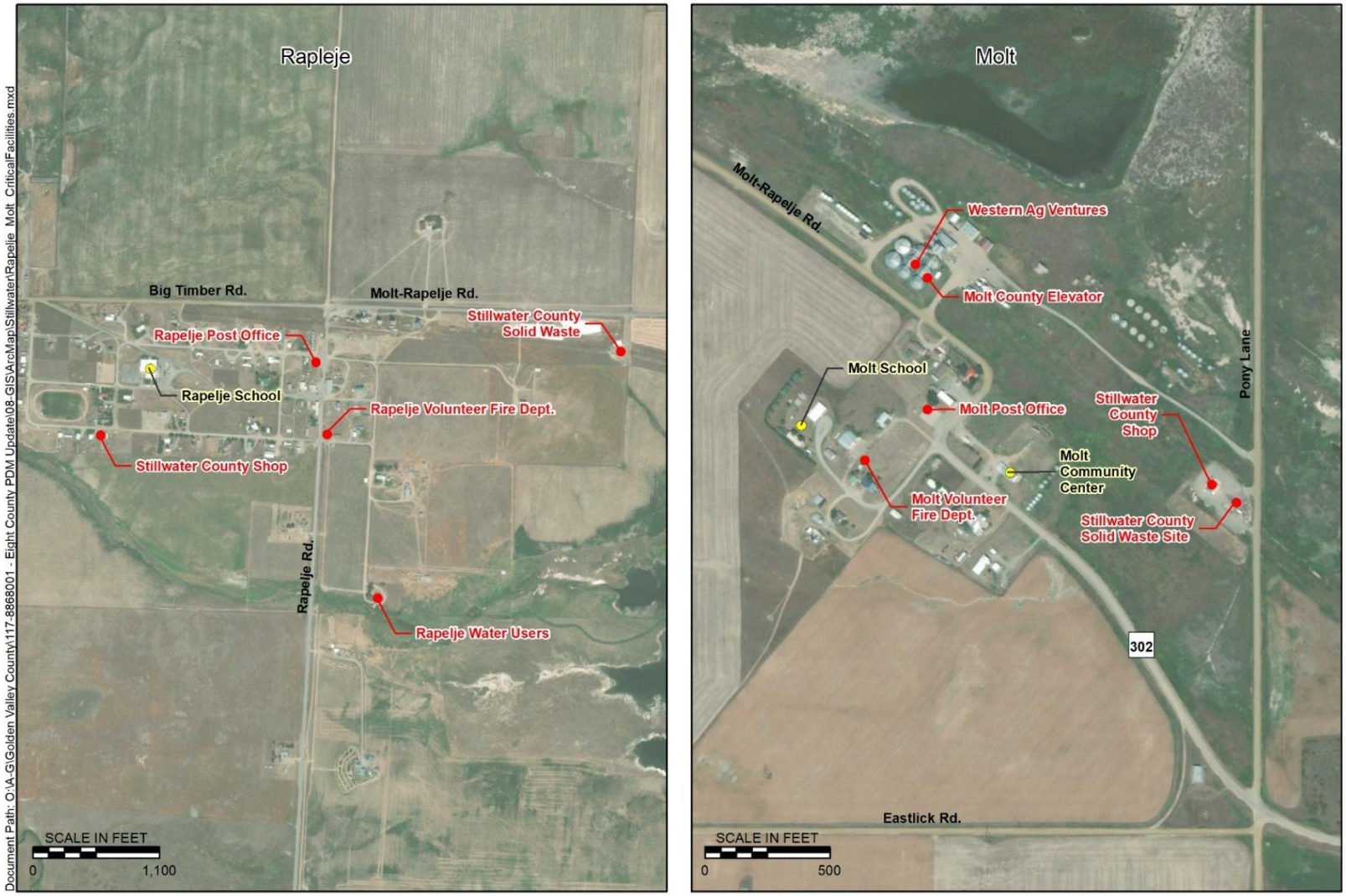


Figure 3D
Rapelje and Molt Critical Facilities
Stillwater County, Montana
Multi-Hazard Mitigation Plan

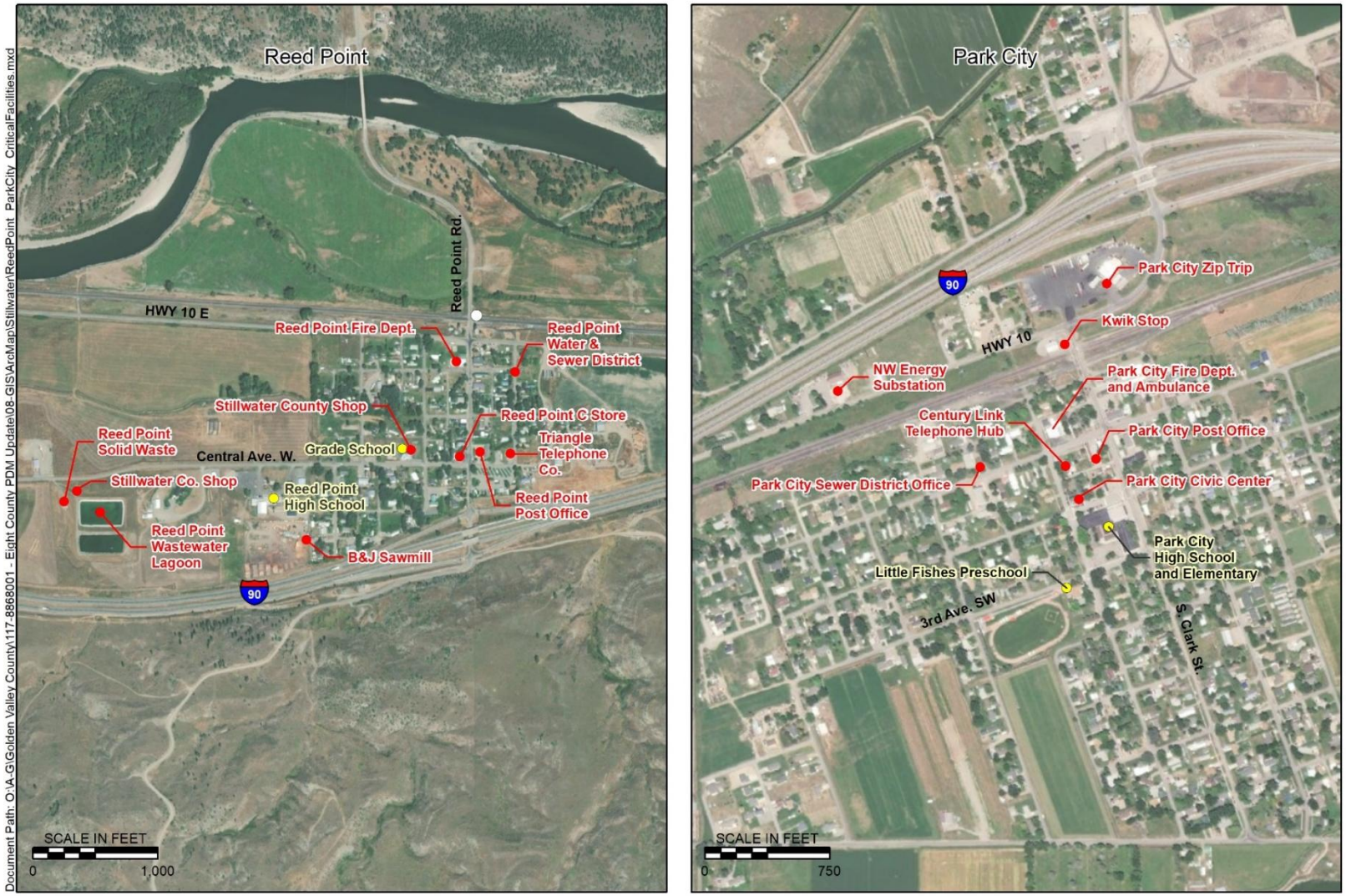


Figure 3E
Reed Point and Park City Critical Facilities
Stillwater County, Montana
Multi-Hazard Mitigation Plan

Bridge data was obtained from the Montana State Library, Natural Resource Information System (NRIS) and the National Bridge Inventory. Bridge replacement values were extrapolated using unit costs for span length and width. **Figure 4** presents the bridge locations in Stillwater County. **Appendix C-2** presents a key to the bridge inventory. Stillwater County may wish to enhance the bridge data for the 2030 MHMP update by adding the major culverts in the county.

Building stock data was downloaded from the Montana State Library, NRIS Structures Framework dataset. This dataset consists of a routinely updated database of primary structures/buildings and addresses across the state of Montana. For the hazard risk analysis, important information within this dataset includes structure type and parcel number. Structure type indicates building function, e.g., agricultural, residential, commercial, churches, schools, etc. The four structure types retained for the hazard analysis included residential, and commercial, industrial, and agricultural. The dataset provides spatial locations of structures within each parcel.

The NRIS Structures Framework dataset does not contain building values, an important factor in the MHMP vulnerability analysis. However, the dataset does contain parcel numbers which were related to the MDOR Cadastral Mapping Program dataset which contains both parcel numbers and building values.

4.1.2 Vulnerable Population

Using the number of residential structures in each hazard impact area, vulnerable population was estimated by assigning U.S. Census County estimates on number of persons residing in each structure, percent of population over age 65 years, and under age 18. The number of residential buildings within a hazard impact area was multiplied by its respective county average number of people residing in a household in Montana (U.S. Census Quick Facts). Exceptions include structures typed as "multi-family" residential dwellings and "Nursing Home". Multi-Family structures (e.g., apartment buildings) were estimated at 18 people and nursing homes were estimated at 40 people. Census data also provided county percentages for persons under 18 years and persons 65 years and over. These percentages were multiplied by the total population number within a hazard area to calculate people at risk under 18 and age 65 years or more.

4.1.3 Hazard Identification

The 2015 Stillwater County PDM Plan identified 13 hazards including: wildfire, hazardous material incidents, transportation accidents, severe weather, flooding, dam failure, communicable disease, drought, landslide, avalanche, terrorism, violence, and civil unrest. These hazards were reviewed by the MHMP Planning Team who considered what other hazards might have emerged since development of the 2015 PDM Plan and/or should not be detailed in the 2021 Plan update. Further details on hazard reconciliation is presented in *Section 4.1.5*.

4.1.4 Hazard Profiles

Hazard profiles were prepared for each of the identified hazards and are presented within this section according to their prioritized rank (see *Section 4.1.5*). The level of detail for each hazard is generally limited by the amount of data available.

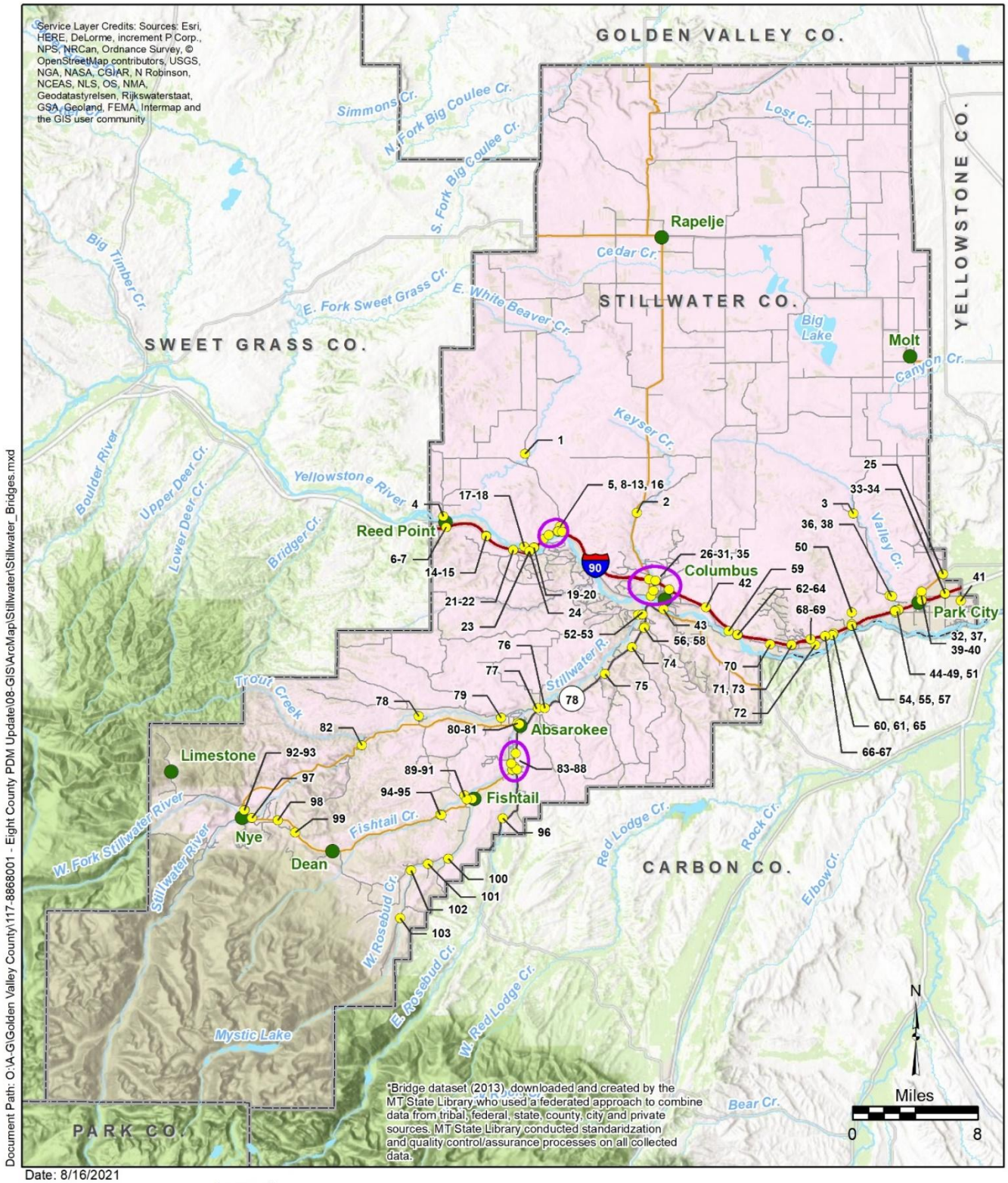


Figure 4
Bridge Inventory
Stillwater County, Montana
Multi-Hazard Mitigation Plan

Each hazard profile contains a description of the hazard and the history of occurrence, the vulnerability and area of impact, probability and magnitude, an evaluation of how future development is being managed to reduce risk, and how Unexpected Weather Event may impact hazard probability and magnitude in the future. The methodology used to analyze each of these topics is further described below.

Description and History

A number of databases were used to describe and compile the history of hazard events profiled in this plan. This data was supplemented by input from the public, local officials, newspaper accounts, and internet research. The two primary databases used included the National Climatic Data Center (NCDC) Storm Events Database and Spatial Hazard Events and Losses Database for the United States (SHELDUS).

The NCDC Storm Events database receives Storm Data from the National Weather Service. The NWS receives their information from a variety of sources, including county, state and federal emergency management officials, local law enforcement officials, skywarn spotters, NWS damage surveys, newspaper clipping services, the insurance industry, and the public. Storm Data is an official publication of the NOAA which documents the occurrence of storms and other significant weather phenomena having sufficient intensity to cause loss of life, injuries, significant property damage, and/or disruption to commerce.

SHELDUS is a county-level hazard data set for the United States for 18 different natural hazard event types. For each event, the database includes the date, location, property losses, crop losses, injuries, and fatalities that affected each county. The database includes every loss-causing and/or deadly event between 1960 through 1975 and from 1995 onward. Between 1976 and 1995, SHELDUS reflects only events that caused at least one fatality or more than $50,000 in property or crop damages. To compensate for the under-reporting of losses in general and to provide more loss-information for rural counties, SHELDUS now reports U.S. Department of Agriculture (USDA) data, which breaks down losses by floods, droughts, etc. just like the traditional SHELDUS data. However, the USDA data are all insured losses, i.e. disaster crop insurance payments (indemnity payments).

Vulnerability and Area of Impact

Vulnerabilities are described in terms of potential losses to critical facilities, structures, population, and socioeconomic values that can be affected by the hazard event. Hazard impact areas describe the geographic extent to which a hazard can impact a jurisdiction and are uniquely defined on a hazard-by-hazard basis. Mapping of the hazards, where spatial differences exist, allows for hazard analysis by geographic location. Some hazards can have varying levels of risk based on location. Other hazards cover larger geographic areas and affect the area uniformly.

Probability and Magnitude

Probability of a hazard event occurring in the future was assessed based on hazard frequency over a 100-year period. Hazard frequency was based on the number of times the hazard event occurred divided by the period of record. If the hazard lacked a definitive historical record, the probability was assessed qualitatively based on regional history and other contributing factors. Probability was broken down as follows:

- Highly Likely – greater than 1 event per year (frequency greater than 1).
- Likely – less than 1 event per year but greater than 1 event every 10 years (frequency greater than 0.1 but less than 1).
- Possible – less than 1 event every 10 years but greater than 1 event every 100 years (frequency greater than 0. 01 but less than 0.1).
- Unlikely – less than 1 event every 100 years (frequency less than 0.01)

The magnitude or severity of potential hazard events was evaluated for each hazard. Magnitude is a measure of the strength of a hazard event and is usually determined using technical measures specific to the hazard. Magnitude was calculated for each hazard where property damage data was available. Magnitude is expressed as a percentage according to the following formula:

- (Property Damage / Number of Incidents) / $ of Building Stock Exposure

Future Development

The impact to future development was assessed based on potential opportunities to limit or regulate development in hazardous areas such as building codes, zoning and subdivision regulations. The impacts were assessed through a narrative on how future development could be impacted by the hazard. Plans, ordinances and/or codes currently in place were identified that could be revised to better protect future development in Stillwater County from damage caused by natural and man-made hazards.

Unexpected Weather Event

An essential aspect of hazard mitigation is predicting the likelihood of hazard events in a planning area. Typically, predictions are based on statistical projections from records of past events. This approach assumes that the likelihood of hazard events remains essentially unchanged over time. Thus, averages based on the past frequencies of, for example, floods are used to estimate future frequencies: if a river has flooded an average of once every 5 years for the past 100 years, then it can be expected to continue to flood an average of once every 5 years.

For hazards that are affected by climate conditions, the assumption that future behavior will be equivalent to past behavior is not valid if climate conditions are changing. As flooding is generally associated with precipitation frequency and quantity, for example, the frequency of flooding will not remain constant if broad precipitation patterns change over time. Specifically, as hydrology changes, storms currently considered to be a 1 percent annual chance event (100-year flood) might strike more often, leaving many communities at greater risk. The risks of, landslide, severe storms, extreme heat and wildfire are all affected by climate patterns as well. For this reason, an understanding of Unexpected Weather Event is pertinent to efforts to mitigate natural hazards. Information about how climate patterns are changing provides insight on the reliability of future hazard projections used in mitigation analysis.

At the end of each hazard profile is a discussion on Unexpected Weather Event. The information provides insight on how the hazard may be impacted by Unexpected Weather Event and how these impacts may alter current exposure and vulnerability for the population, property, and critical facilities.

4.1.5 Hazard Ranking and Priorities

In ranking the hazards, the MHMP Planning Team completed a Calculated Priority Risk Index (CPRI) Work Sheet. The CPRI examines five criteria for each hazard (probability, magnitude/severity, economic impact, warning time, and duration); the risk index for each, according to four levels, then applies a weighting factor (**Table 4.1-1**). The result is a score that has been used to rank the hazards. Each hazard profile presents its CPRI score with a cumulative score sheet included in **Appendix C-1**. **Table 4.1-2** presents the results of the CPRI scoring for all hazards.

Table 4.1-1. Calculated Priority Risk Index

CPRI Category	Degree of Risk			Assigned Weighting Factor
	Level ID	Description	Index Value	
Probability	Unlikely	Rare with no documented history of occurrences of events.	1	30%
		Annual probability of less than 0.01.		
	Possible	Infrequent occurrences with at least one documented or anecdotal historic event.	2	
		Annual probability that is between 0.1 and 0.01		
	Likely	Frequent occurrences with at least two or more documented historic events	3	
		Annual probability that is between 1 and 0.1		
	Highly Likely	Common events with a well-documented history of occurrence.	4	
		Annual probability that is greater than 1		
Magnitude/ Severity	Negligible	Negligible property damages (less than 5% of critical and non-critical facilities and infrastructure).	1	25%
		Injuries or illnesses are treatable with first aid and there are no deaths.		
		Negligible quality of life lost.		
		Shut down of critical facilities for less than 24 hours.		
	Limited	Slight property damages (greater than 5% and less than 25% of critical and non-critical facilities and infrastructure).	2	
		Injuries or illnesses do not result in permanent disability and there are no deaths.		
		Moderate quality of life lost		
		Shut down of critical facilities for more than 1 day and less than 1 week.		
	Critical	Moderate property damages (greater than 25% and less than 50% of critical and non-critical facilities and infrastructure).	3	
		Injuries or illnesses result in permanent disability and at least one death.		
		Shut down of critical facilities for more than 1 week and less than 1 month		
	Catastrophic	Severe property damages (greater than 50% of critical and non-critical facilities an infrastructure).	4	
		Injuries or illnesses result in permanent disability and multiple deaths.		
		Shut down of critical facilities for more than 1 month.		
Economic Impact	Negligible	Little to no annual economic impact.	1	20%
	Limited	<$1 million annual economic impact.	2	
	Critical	<$1 billion but >$1 million in annual economic impact.	3	
	Catastrophic	>$1 billion annual economic impact.	4	
Warning Time	Less than 6 hours	Self-explanatory.	4	15%
	6 to 12 hours	Self-explanatory.	3	
	12 to 24 hours	Self-explanatory.	2	
	More than 24 hours	Self-explanatory.	1	
Duration	Less than 6 hours	Self-explanatory.	1	10%
	Less than 24 hours	Self-explanatory.	2	
	Less than one week	Self-explanatory.	3	
	More than one week	Self-explanatory.	4	

Table 4.1-2. Calculated Priority Ranking Index Summary; Stillwater County

Hazard	Probability	Magnitude/ Severity	Economic Impact	Warning Time	Duration	CPRI Score
Wildfire (>10 acres)	Highly Likely	Critical	Critical	<6 hours	>1 week	3.55
Severe Winter Weather	Highly Likely	Critical	Critical	12-24 hours	<1 week	3.15
Flooding	Highly Likely	Limited	Critical	6-12 hours	>1 week	3.15
Communicable Disease (human)	Highly Likely	Critical	Critical	>24 hours	>1 week	3.1
Highway Accidents	Highly Likely	Critical	Limited	<6 hours	<6 hours	3.05
Severe Summer Weather	Highly Likely	Limited	Critical	<6 hours	<6 hours	3.0
Landslides	Highly Likely	Limited	Critical	<6 hours	<6 hours	3.0
Dam Failure	Unlikely	Catastrophic	Catastrophic	<6 hours	<24 hours	2.9
Structure Fire (urban fire)	Possibly	Critical	Critical	<6 hours	<1 week	2.85
Aircraft Accidents	Possibly	Critical	Limited	<6 hours	<24 hours	2.55
Communicable Disease (livestock,	Likely	Negligible	Limited	<6 hours	>1 week	2.55
Cyber Security	Possibly	Negligible	Critical	<6 hours	>1 week	2.45
Haz-Mat Incidents (fixed)	Likely	Negligible	Limited	<6 hours	<24 hours	2.35
Drought	Likely	Negligible	Critical	>24 hours	>1 week	2.3
Railroad Accidents	Possibly	Limited	Limited	<6 hours	<24 hours	2.3
Terrorism/Violence/Civil Unrest	Possibly	Limited	Limited	<6 hours	<24 hours	2.3
Pipeline Spills	Unlikely	Negligible	Critical	<6 hours	<24 hours	1.95
Avalanche (involving people)	Possibly	Negligible	Negligible	<6 hours	<6 hours	1.75
Earthquake	Possibly	Negligible	Negligible	<6 hours	<6 hours	1.75
Volcanic Ash	Possibly	Negligible	Negligible	12-24 hours	>1 week	1.75

The Calculated Priority Risk Index scoring method has a range from 0 to 4. "0" being the least hazardous and "4" being the most hazardous situation.

The MHMP Planning Team felt that the CPRI ranking did not accurately represent hazard priorities for Stillwater County. As such, the hazards were prioritized, and the top eight hazards are profiled in this Plan. Hazards profiled in the 2021 MHMP update include those from the 2015 PDM Plan with the following changes. Instead of separate hazard profiles for severe weather and drought, severe summer weather was profiled together with drought, and severe winter weather was profiled separately. Cyber security is a new hazard for the 2021 MHMP and was profiled together with the terrorism, violence, and civil unrest hazards. The landslide hazard was profiled independent of avalanche in the 2021 MHMP. And the hazardous material incident profile included transportation accidents. The MHMP Planning Team decided that the avalanche hazard should be de-emphasized in the 2021 MHMP because it is not considered are large risk in Stillwater County. **Table 4.1-3** shows the hazard priority for the 2021 MHMP compared to how hazards were ranked in 2015.

Table 4.1-3. Prioritized Hazards for 2021 MHMP

2021 Hazard Rank	Hazard Profile	2015 Hazard Rank / Comments	Section in 2021 Plan
#1	Wildfire	#1 in 2015 PDM Plan.	Section 4.2
#2	Severe Summer Weather & Drought	Severe Weather #3 & Drought #6 in 2015 PDM Plan.	Section 4.3
#3	Severe Winter Weather & Highway Accidents	Severe Weather #3 & Transportation Accidents #2 in 2015 PDM Plan.	Section 4.4
#4	Flooding & Dam Failure	#4 in 2015 PDM Plan.	Section 4.5
#5	Landslide	#7 in 2015 PDM Plan.	Section 4.6
#6	Communicable Disease	#5 in 2015 PDM Plan.	Section 4.7
#7	Haz-Mat Incidents/ Railroad Accidents / Pipeline Spills	#2 in 2015 PDM Plan.	Section 4.8
#8	Terrorism/Violence/Civil Unrest/Cyber Security	#8 in 2015 PDM Plan. Cyber Security new hazard for 2021 MHMP.	Section 4.9

4.1.6 Assessing Vulnerability – Estimating Potential Losses

The methodology used in the vulnerability analysis to estimate loss presents a quantitative assessment of the building stock, population, and critical facility exposure to the individual hazards. For hazards that are not uniform across the jurisdiction and instead occur in specific areas (e.g. wildfire, drain and ditch failure, hazardous material incidents/transportation accidents, flooding, dam failure, landslide and rock falls) the hazard area factored into loss estimation calculations. Building stock data, available from the NRIS Structures Framework and MDOR Cadastral Mapping Program was used in the analysis. Linking these two data sources enabled the location of structures within land parcels to be connected to their appraised value. Using GIS, hazard risk areas were intersected with the building stock data to identify the number of structures and exposure due to each hazard. Hazard risk areas were also intersected with critical facility, infrastructure and bridge data to determine the number and exposure to each hazard. Using the number of residential structures in each hazard area, vulnerable population was estimated by assigning U.S. Census estimates on number of persons residing in each structure, percent of population over age 65 years, and under age 18.

For hazards that are uniform across the jurisdiction with damage data (i.e. severe weather) the methodology presented below was used to determine annualized property loss.

- Exposure x Frequency x Magnitude

Where:

- Exposure = building stock, vulnerable population, or critical facilities at risk
- Frequency = annual number of events determined by calculating the number of hazard events / period of record
- Magnitude = percent of damage expected calculated by: (property damage/# incidents)/ building stock or critical facility exposure

For hazards without documented property damage (i.e. communicable disease, terrorism/cyber security), magnitude could not be calculated and therefore, exposure was determined to be the total value of the critical facilities and infrastructure, general building stock or population at risk. Annualized loss estimates cannot be calculated without property damage using this risk assessment approach.

Economic losses associated with the drought hazard were qualitatively analyzed by looking at crop production (winter wheat) statistics and comparing these across drought and non-drought years. Secondary impacts to retail sales in the community were not evaluated.

4.1.7 Data Limitations

Risk assessment and vulnerability analysis results are only a general representation of the potential loss that may be experienced from a hazard event and there are many inherent inaccuracies with the methodology used. Output is only as good as the data sources used and Stillwater County may wish to consider alternate data for future MHMP updates.

The remainder of this section presents hazard profiles organized in accordance with county priority followed by a risk assessment summary. Vulnerability analysis results for each of the hazards, are compiled at the end of this section for Stillwater County and the City of Columbus.

4.2 Wildfire

CPRI SCORE = 3.55

Description and History

A wildfire is an unplanned fire, a term which includes grass fires, forest fires and scrub fires, both man-caused and natural in origin. Severe wildfire conditions, often brought on by drought, have historically represented a threat of potential destruction to the agricultural economy within the region. Negative impacts of wildfire include loss of life, property and resource damage or destruction, severe emotional crisis, widespread economic impact, disrupted and fiscally impacted government services, and environmental degradation.

Wildfire risk in a particular area is a combination of the chance that a wildfire will start in or reach that area and the potential loss of human values if it does. Human activities, weather patterns, wildfire fuels, agricultural practices, values potentially threatened by fire, and the availability (or lack) of resources to suppress a fire all contribute to wildfire risk. Conservation Reserve Program land and the change of agricultural practices, i.e. no-till farming, have contributed to the wildland fire risk in Stillwater County.

Fire season is the result of low rainfall, high temperatures, low humidity, and thunderstorms, high winds and lightning. Varied topography, semi-arid climate, and numerous human-related sources of ignition make this possible. Man-made wildfire ignitions including debris burning, downed powerlines, fireworks, arson, and heated farm equipment in dry grass or crops. The most common ignition source is lightning. Dry lightning storms have been responsible for igniting several fires simultaneously. Major wildfires can occur at any time of year.

Table 4.2-1 presents warning and advisory criteria for wildfire and a description of prohibitions that land management agencies can put into effect to reduce fire risk and prevent wildfires during periods of high to extreme danger.

Table 4.2-1. Warning, Advisories and Restrictions for Wildfire

Warning/Advisory/ Restriction	Description
Fire Weather Watch	A fire weather watch is issued when Red Flag conditions (see Red Flag Warning) are expected in the next 24 to 72 hours.
Red Flag Warning	A red flag warning is issued when Red Flag criteria are expected within the next 12 to 24 hours. A Red Flag event is defined as weather conditions that could sustain extensive wildfire activity and meet on e or more of the following criteria in conjunction with “Very High” or “Extreme” fire danger: • Sustained surface winds, or frequent gusts, of 25 mph or higher; • Unusually hot, dry conditions (relative humidities less than 20%); • Dry thunderstorm activity forecast during an extremely dry period; • Anytime the forecaster foresees a change in weather that would result in a significant increase in fire danger. For example, very strong winds associated with a cold front even though the fire danger is below the “Very High” threshold.
Fire Warning	A fire warning may be issued by local officials when a spreading wildfire or structure fire threatens a popula ted area. Information in the warning may include a call to evacuate areas in the fire’s path as recommended by officials according to state law or local ordinance.
Dense Smoke Advisory	Dense smoke advisories are issued when the widespread visibilities are expected at a ¼ mile or less for a few hours or more due to smoke.

Table 4.2-1. Warning, Advisories and Restrictions for Wildfire

Warning/Advisory/ Restriction	Description
Stage 1 Fire Restriction	No building, maintaining, attending, or using a fire, campfire, or stove fire without a permit except in Forest Service developed camp or picnic grounds. No smoking unless in an enclosed vehicle or building, a developed recreation site, or while stopped in an area at least three feet in diameter that is barren or cleared of all flammable material. No operation of welding, acetylene, or other torch with an open flame. No operation or using any internal or external combustion engine without a spark arresting device properly installed, maintained and in effective working order.
Stage 2 Fire Restriction	No building, maintaining, attending or using open fire campfires or stove fires. No smoking unless in an enclosed vehicle or building, a developed recreation site, or within a three-foot diameter cleared to mineral soil. No operation of welding, acetylene, or other torch with an open flame. No operation or using any internal or external combustion engine without a spark arresting devise properly installed, maintained and in effective working order.

Source: National Weather Service, 2021; National Interagency Fire Center, 2021. (https://gacc.nifc.gov/rmcc/dispatch_centers/r2ftc/documents/Fire_Restriction_Chart.pdf)

Vegetation type and degree of slope are the main factors in determining natural fire hazards in Stillwater County, along with weather conditions. The steeper forested slopes in the Beartooth Mountains, and the eroded uplands along the Yellowstone and Stillwater River valleys present a higher potential for wildland fires. Riparian zones, wetlands, cultivated pastures and the urban area are considered low natural fire hazard areas.

Extreme fire behavior in the county can occur due to prolonged drought conditions causing low fuel moisture, stressed vegetation, and mortality in some timbered areas; high winds and resulting blow downs; heavy, mature, fire-dependent fuels; and rough breaks in the center and southern parts of the county and steep terrain and canyons (CWPP, 2021).

Stillwater County has witnessed a number of large wildfires that have destroyed property and affected agricultural assets, scenic resources, and impacted air quality. Between 1970 and 2021, over 60 fires greater than 10 acres burned more than 360,000 acres in the county (**Table 4.2-2**).

Table 4.2-2. Wildfire Listings >10 Acres in Stillwater County

Date	Name	Cause	Acres	Date	Name	Cause	Acres
8/16/1970	Sand Dunes	Smoking	110	8/19/2007	Springtime	Lightning	30
11/9/1980	Big Park	Lightning	25	9/3/2007	Hensley Creek	Equipment	220
12/20/1980	Mary's Pond	Lightning	15	4/19/2008	Rimrock	Debris Burning	60
11/30/1980	Benbow	Miscellaneous	460	4/27/2008	Iron Bridge	Lightning	1,261
1/12/1988	Stillwater	Miscellaneous	20	8/1/2008	Tumble	Lightning	619
6/19/1988	Storm Creek	Miscellaneous	56,856	8/5/2008	Dovetail	Miscellaneous	150
8/7/1990	Sand Dunes	Lightning	910	7/19/2009	Sweet Clover	Miscellaneous	190
8/1/1996	Stillwater Complex	Lightning	46	9/3/2009	Eagle Mount	Powerlines	1,220
8/8/1999	Alex Creek	Lightning	1,231	7/4/2010	Hearts & Diamonds	Fireworks	10
7/11/1999	Eagle Mountain	Unknown	400	8/21/2010	Stump Gulch	Miscellaneous	9,870
8/19/1999	Eagle Mountain	Campfire	109	9/27/2011	Cathedral	Human-caused	60
5/5/2001	Svenson Ranch	Debris Burning	1,528	7/25/2012	Skibstad	Equipment	3,348
8/4/2001	Weigen	Lightning	867	8/22/2013	Hwy 10	Equipment	91
8/19/2001	Little Park	Campfire	30	8/3/2014	Old Bull Fire	Equipment	10
4/27/2002	Joe Hill/McNally	Lightning	300	3/31/2015	Pine Crest	Slash Burning	3,000
9/6/2002	Cow Creek	Unknown	5,495	9/19/2015	Arrowhead	Equipment Use	663
8/10/2003	Hobble	Unknown	38,365	8/30/2015	Locomotive	Lightning	34
8/14/2003	Cathedral Peak	Lightning	1,973	6/29/2015	Gooseneck Fire	Lightning	13
8/15/2003	Saderbalm	Unknown	850	8/5/2016	Upper Joe Hill	Miscellaneous	78
9/2/2004	Pine Hill	Lightning	2,022	7/23/2016	Countryman	Miscellaneous	71
8/26/2005	Cottonwood Creek	Lightning	3,485	7/5/2017	Huntley Butte	Powerline	20
4/14/2006	Trout Creek	Human-caused	181	7/30/2017	Mile Marker 417	Unknown	144
7/6/2006	Park City Complex	Lightning	1,845	7/29/2017	Pronghorn	Lightning	79

Table 4.2-2. Wildfire Listings >10 Acres in Stillwater County

Date	Name	Cause	Acres	Date	Name	Cause	Acres
7/10/2006	Sanders	Debris Burning	3,150	8/1/2017	No Name Gulch	Unknown	22
7/29/2006	Molt Assist	Lightning	310	4/1/2018	Hailstone Basin Rd	Debris Burning	150
8/6/2006	Benedict	Lightning	841	8/28/2019	Hailstone Basin/Hoagland Rd	Miscellaneous	60
8/14/2006	Bucket	Smoking	20	4/7/2019	Keller	Miscellaneous	40
8/24/2006	Derby	Lightning	207,304	8/3/2019	Valley Creek	Lightning	19
7/15/2007	Blown Tire	Equipment	120	8/7/2019	Swather 2	Miscellaneous	29
7/19/2007	Initial Creek	Lightning	16	8/2/2020	Falling Star	Human Caused	2,000
8/14/2007	Pine Crest	Equipment	325	8/10/2021	Trout Creek	Lightning	8,015

Source: DNRC, 2021a; BLM, 2018; USFS, 2021.

Stillwater County received a federal disaster declaration for wildfire in 2000 (DR-1340-MT). Fire Management Assistance Grants (FMAGs) were authorized for the 2003 Hobble Fire (FM-2488-MT), the 2006 Sanders Fire (FM-2652-MT), the 2006 Derby Fire (FM-2671-MT), the 2009 East Mount Fire (FM-2837-MT), and the 2020 Falling Star Fire (FM-5324-MT). Newspaper accounts of several significant wildfires in Stillwater County are presented below.

2006 Derby Fire - The Derby fire was ignited by a lightning strike on the afternoon of August 22, 2006. By the time it was fully contained on October 15th, it had burned 223,570 acres in Stillwater and Sweet Grass Counties. In the Absarokee Fire District, 849 residences were evacuated, and 26 homes and 20 outbuildings destroyed. The Stillwater Mine was closed for several days during the Derby Fire.

2012 Skibstad Fire – A generator malfunctioned starting the Skibstad Fire during August 2012, that eventually burned 3,354 acres and destroyed 10 outbuildings. Extreme dry conditions, shifting winds and nearby subdivisions on Shane Ridge and Shane Creek Road prompted a swift and massive response. Stillwater County Commissioners signed a resolution for a mandatory evacuation for a 5 mile portion of Shane Creek Road. In all, at least 75 homes were affected by either the mandatory, voluntary or "prepare to evacuate" phone calls and door-to-door notifications. The fire was managed by a Northern Rockies Type 2 Incident Management Team who had 234 personnel, 22 engines, two bulldozers, six water tenders and one helicopter on scene. (Stillwater County News, *Skibstad Fire Burns 3,354 Acres and 10 Buildings,* August 2, 2012).

2015 Pine Crest Fire – Slash piles were to blame for sparking what turned into a 3,000 acre wildfire in the Pine Crest subdivision in March 2015. The rare winter wildland fire broke out in the subdivision located between Columbus and Park City while snow was still on the ground. Approximately 89 homes are located there. A Pine Crest resident described a nightmarish scene with neighbors "running for their lives" from a fast-moving, wind-driven fire. A mandatory evacuation was ordered for the upper portion of the subdivision. The fire burned 3,000 acres and claimed two homes and three outbuildings. Columbus Fire Rescue, Absarokee fire crews, Park City fire crews and the Sheriff's Office drew heavy support from the Montana DNRC, the BLM, U.S. Fish and Wildlife Service and the U.S. Forest Service. DNRC spent more than $500,000 fighting the fire. Low visibility from smoke was a factor in a fatal five-vehicle chain reaction accident on I-90. (Stillwater County News, *Pine Crest Fire Ruled Human-Caused and Accidental*, June 25, 2015; Stillwater County News, 3*,000-Acre Pine Crest Fire Claims 2 Homes, 3 Buildings*, April 2, 2015).

2020 Falling Star Fire - Approximately 2,000 acres were burned threatening 300 homes near Park City and Laurel in Stillwater and Yellowstone counties. The fire was determined to be "human caused". Fire crews worked through the night to get the blaze within containment lines – concentrating on structures. Crews were able to keep it from jumping Valley Creek Road. The blaze was reported on Sunday, August 2nd, 2020 and despite being hit hard early with ground and air attacks, quickly grew due to the hot, dry conditions. The fire also threatened the main residential power distribution lines, wooden bridges on Valley Creek Road (which is a major agricultural transportation route), as well as private agricultural water systems and cellular phone towers in the area. (Stillwater County News, *Falling Star Fire now 80 Percent Contained,* August 3, 2020).

A scattering of government and private ownership in Stillwater County can present unique firefighting challenges and opportunities. Stillwater County has large areas of federal- and state-owned lands; the Custer Gallatin National Forest managed by the U.S. Forest Service, the Hailstone and Halfbreed National Wildlife Refuges managed by the U.S. Fish and Wildlife Service, large tracts managed by the BLM, and various state sections. In Stillwater County, there are four rural fire districts: Absarokee, Broadview, Columbus, and Park City. The Broadview district includes an area in Stillwater County. In addition, there are seven volunteer fire departments or companies including Absarokee, Broadview, Columbus Rural, Molt, Park City, Rapelje, and Nye. Written mutual aid agreements have been signed among and between all fire districts or departments in the county, as well as with Sweet Grass, Carbon, and Yellowstone counties, and similar agreements have been reached withstate and federal fire control agencies. The departments within the county also participate in the state mutual aid program.

Stillwater County updated their Community Wildfire Protection Plan (CWPP) in 2021. This document is presented in **Appendix E**. Mitigation projects identified in the CWPP are incorporated herein by reference.

Vulnerability and Area of Impact

People and structures near wildfires are threatened unless adequately protected through evacuation or mitigation. Should fires occur, structures within the wildland-urban interface (WUI) are very vulnerable. The WUI is the zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. A WUI exists anywhere that structures are located close to natural vegetation and where a fire can spread from vegetation to structures, or vice versa. A significant loss of life could occur to residents, firefighters, and others who are in the wildfire area and do not evacuate.

According to the 2015 Stillwater County PDM Plan, the most extreme situation with respect to fuel conditions and values at risk occurs in rural subdivisions where numerous high-value individual homes and subdivisions are in the WUI area in close proximity to the National Forest boundary. The subdivisions in the WUI with over $10,000,000 in estimated building stock include: Pine Crest, Yellowstone River Ranch, Countryman Creek Ranch, Bear Paw, and Spreading Wing Ranch. Subdivisions in close proximity to the Forest Boundary include Cathedral Mountain, Buffalo Jump Ranch, Rainbow Ranch, Whited in the Stillwater drainage and Delger near Benbow Road. According to the MHMP Planning Team, Stillwater County has seen a surge in new residential development over the past few years with a 40 percent increase in sewer permits in 2021. Subdivisions are being planning in areas not previously considered part of the WUI.

Regional electric infrastructure may pass through wildland and non-irrigated agricultural areas. Electric substations, transmission lines, fuel tanks, and radio transmission towers are not often equipped to withstand the heat from a wildfire. A wildfire could disrupt electricity or communications should this infrastructure be damaged. Timber resources, animal habitats, and waterways can all be damaged leading to negative economic and environmental impacts.

Agriculture is one of the largest income-producing segments of the Stillwater County economy and acres of cropland and grazing range represent a substantial investment each year. When the grazing range burns, producers often must reduce their livestock inventory. It can take many years for the pasture to recover and requires a significant financial investment to build back herds. Rangeland and fallow fields in CRP also provide fuel for wildfire.

According to the Stillwater County CWPP, the trend in climatic conditions in recent years has had implications for wildland fire severity. Stillwater County has been experiencing a severe, long-lasting drought. Many areas of the county, particularly the northern portions, receive only small amounts of precipitation even in average years. Lower levels of precipitation affect fuel moisture as well. Arboreal mortality due to the stress of continued drought is occurring in a few timbered areas of the county.

Health effects associated with forest fire smoke exposure has been studied by the Centers for Disease Control. Researchers found the risk of hospital admission for respiratory and circulatory illness was greater during periods of heavy smoke than unexposed areas (CDC, 2001). Smoke blows into Stillwater County from the west. Montana Dept. of Environmental Quality (MDEQ) sends health warnings to schools on hazardous smoke conditions recommending suspension of athletic events. Smoke also affects things like road safety and tourism.

Wildfires dramatically change landscape and ground conditions, which can lead to increased risk of flooding during heavy rains because the burned ground is unable to absorb the falling rain, producing runoff conditions. Because of this, even modest rainstorms over a burned area can result in flash flooding downstream.

Probability and Magnitude

Figure 5 presents a Wildfire Potential Map for Stillwater County from the *Montana Wildfire Risk Assessment* (Pyrologix, 2020) that was prepared for DNRC. The data for this map was compiled considering the likelihood of a fire burning, the intensity of a fire if one should occur, the exposure of assets and resources based on their location, and the susceptibility of those assets and resources to a wildfire. The data indicates the probability for wildfire is generally low in the northern portion of Stillwater County and south of I-90 to about Absarokee. The southwest portion of the county including Limestone, Nye, and Dean are all considered to have a high risk of wildfire including the West Rosebud Creek and Stillwater River area around Nye.

Property damage is difficult to obtain for wildfires since it is typically the agricultural and forest resources that sustain the most damage. In the past 15 years, wildfire has destroyed at least 34 residential structures in the county.

Wildfire does not present a uniform risk across Stillwater County with regard to structures. The wildfire hazard area used in the MHMP analysis consisted of the WUI layer from the 2018 State of Montana MHMP which was comprised of the U.S. Forest Service's *Community Zones Threatened by Large Fire,* the WUI layer from the Region 1 Healthy Forest Restoration Act, and by buffering interface communities with a population density equal or greater than 250 people by four miles. The Columbus city limits were excluded from the wildfire hazard area because they are protected by a municipal fire department. **Figure 5A** shows the wildfire hazard area for Stillwater County.

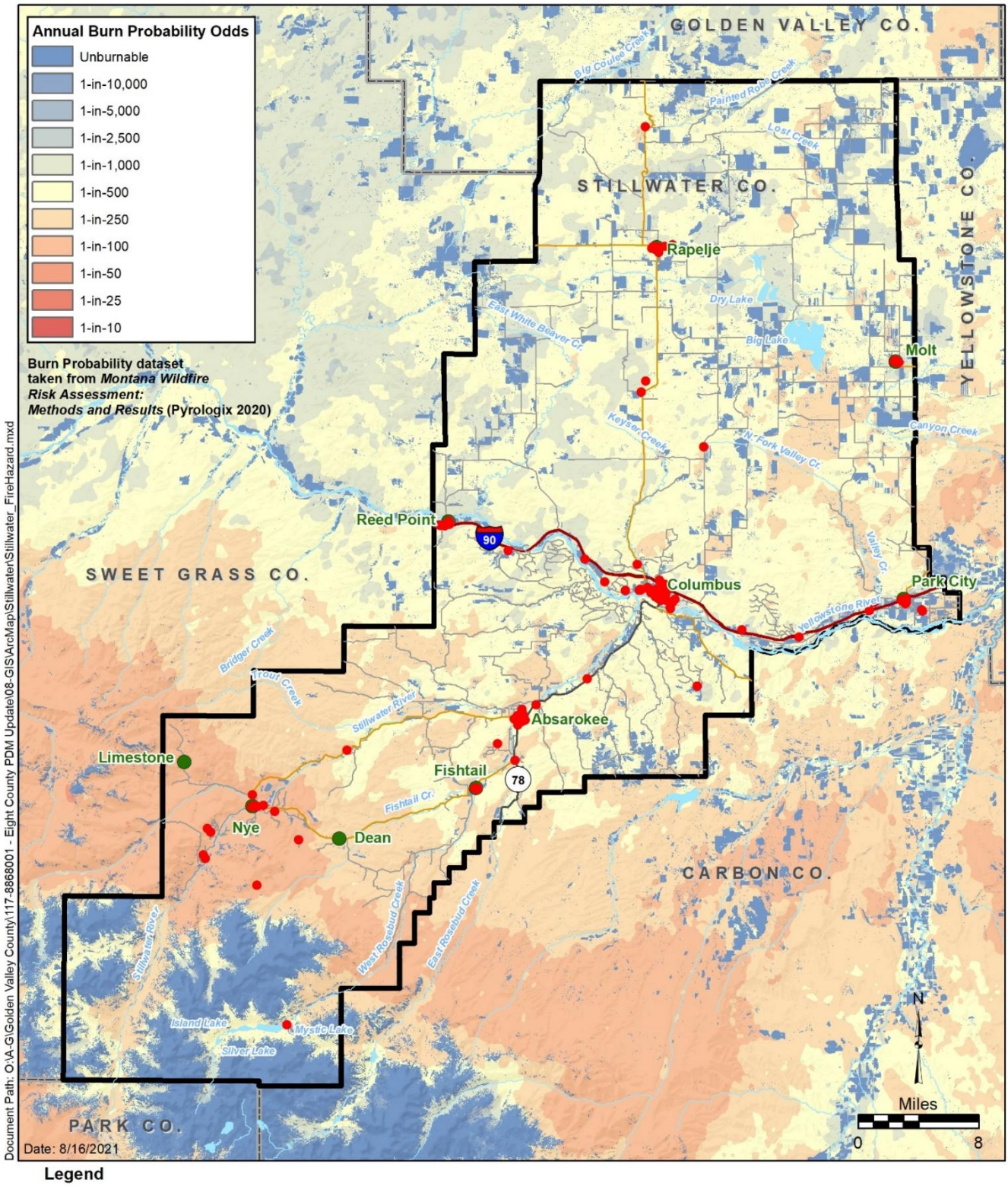
To complete the vulnerability analysis for this project, GIS was used to intersect the wildfire hazard area with both the critical facility and NRIS Structures dataset. Estimates of vulnerable population were calculated using U.S. Census county estimates. Exposure values are presented in **Table 4.2-3**. Building exposure reflects only the monetary structure value and does not account for improvements or personal effects that may be lost to wildfire.

Table 4.2-3. Stillwater County Vulnerability Analysis; Wildfire

Category	Stillwater Co. (balance)	Columbus (City)
Residential Property Exposure $	$641,512,536	$4,389,830
# Residences at Risk	2,862	17
Commercial, Industrial & Agricultural Property Exposure $	$125,372,879	$40,915
# Commercial, Industrial & Agricultural Properties at Risk	558	1
Critical Facilities Exposure Risk $	$86,864,635	$8,735,945
# Critical Facilities at Risk	109	2
Bridge Exposure $	$67,413,433	$0
# Bridges at Risk	100	0
Persons at Risk	7,429	38
Persons Under 18 at Risk	1,552	8
Persons Over 65 at Risk	1,750	9

GIS analysis of the wildfire risk to Stillwater County indicates that 440,351 acres (38.4 percent) are within the wildfire hazard area. According to the vulnerability analysis, 2,879 residences, 559 commercial, industrial and agricultural buildings, and 111 critical facilities are located in the wildfire hazard area. The *Wildfire* section in **Appendix C-3** lists the critical facilities and bridges within wildfire hazard area.

Wildfires generally occur more than once per year in Stillwater County and therefore, the probability of future events is rated as “highly likely”.



Legend

Critical Facility
Town
Interstate
Primary Road
Secondary Road
City-County Road
Stream
Lake
Stillwater County
County Boundary

Figure 5
Wildfire Probability
Stillwater County, Montana
Multi-Hazard Mitigation Plan

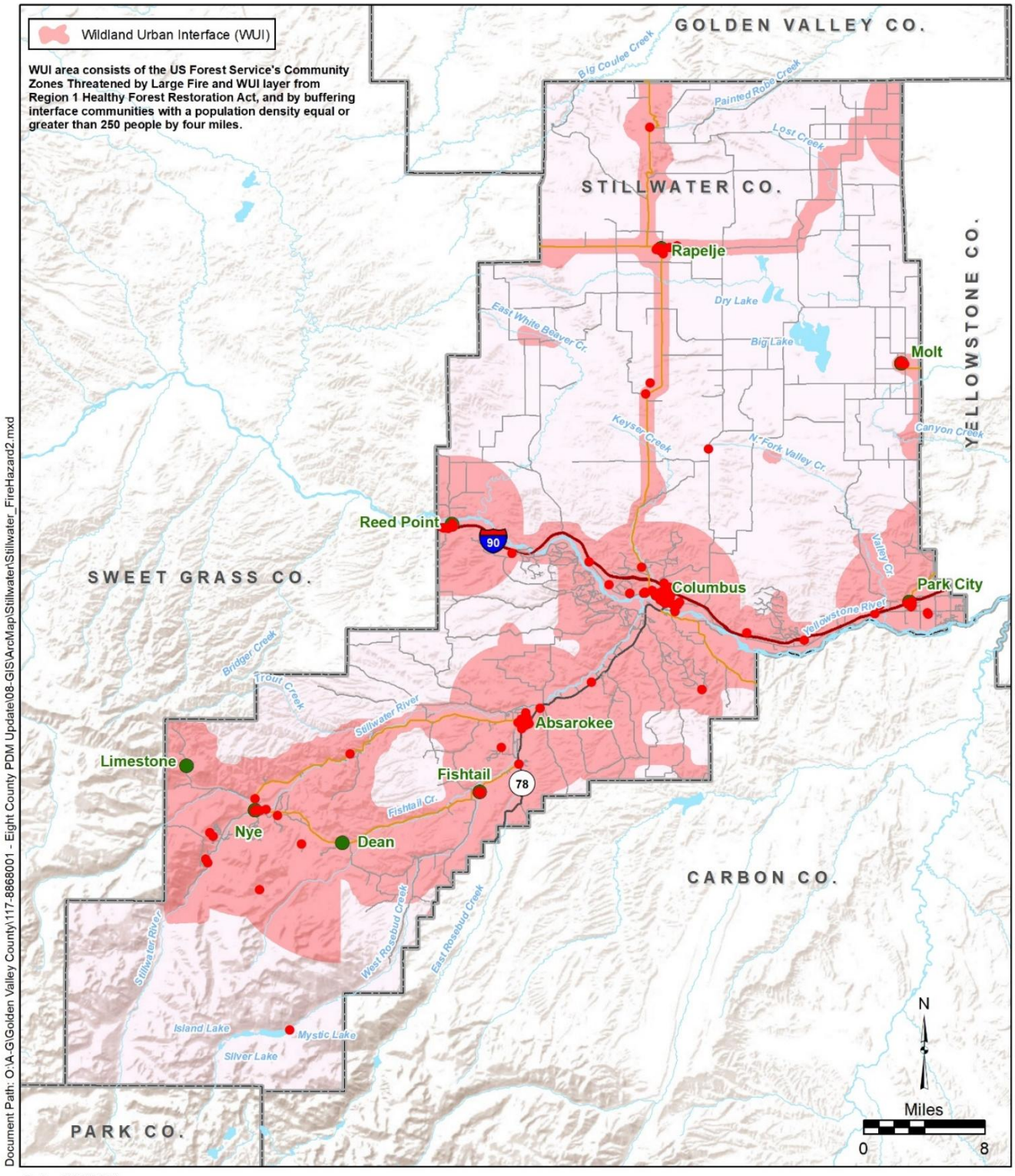


Figure 5A
Wildfire Hazard Area
Stillwater County, Montana
Multi-Hazard Mitigation Plan

Future Development

Wildfire's impact to structures can be mitigated through comprehensive land use planning that includes housing development design, fuels management, and public education. Land use regulations can reduce the incidence of wildland fire by addressing defensible space, access for emergency vehicles, and on-site firefighting water supplies.

The Stillwater County Subdivision Regulations describe fire protection requirements for all proposed subdivisions. They stipulate that all premises have a reasonable level of fire protection and life-safety for the public and firefighters, fire apparatus access roads, and an approved water supply capable of providing the required water flow for fire protection. In areas with high fire danger, defensible space requirements apply. In the event that the proposed subdivision is located within the WUI, the subdivider must submit a plan to mitigate fire hazards in accordance with the fire department having jurisdiction.

Unexpected Weather Event

Montana has been on a steady warming trend for decades, up over 3°F since 1950, and all projections are that it will continue. The summer of 2017 was the second warmest on record since 1950 at 4°F above average, and the persistent high temperatures coupled with the record lowest rainfall in July and August shifted the relatively wet conditions of spring into extreme drought by mid-summer followed by a severe wildfire season (Whitlock et.al., 2017).

The climate future with respect to wildfire will include additional warming with less precipitation in the summer months which set the stage for drier conditions and more fires. Over the next century, extreme heat days (above 90°F) are projected to increase by an additional 5-35 days across the state. And, as a result of greater drought, forest fires will likely increase in size, frequency, and possibly severity.

In a given year, warmer weather and less precipitation dries out fuel loads and creates conditions for rapid fire spread. Fire records dating back decades to millennia show a clear link between warmer temperatures, lower precipitation and an increase in the number of fires and acres burned. Since 1986, wildfire seasons are nearly 80 days longer, with increases in large fires and fires at high elevations (Whitlock et.al., 2017).

Larger, more severe, and more frequent fires may impact the people, property and critical facilities by increasing the risk from ignition from nearby fire sources. Unexpected Weather Event also may increase winds that spread fires. Faster fires are harder to contain, and thus are more likely to expand into residential neighborhoods.

Secondary impacts, such as air quality concerns and public health issues, will likely increase due to smoke from wildfire. Wildfire smoke generates a lot of particulate matter 2.5 microns or less in diameter. Those particles are so small, they easily bypass most of the human body's defenses and move directly from the lungs into the bloodstream. A recent study demonstrates that smoke waves are likely to be longer, more intense, and more frequent under Unexpected Weather Event, which raises health, ecologic and economic concerns.

4.3 Severe Summer Weather and Drought

CPRI SCORES
SEVERE SUMMER WEATHER = 3.0
DROUGHT = 2.3

Description and History

Severe weather hazards have become more significant in recent years due to Unexpected Weather Event. Natural resource trends indicate the mean annual precipitation has been below average and the mean annual temperatures have been above average for the past five years making drought conditions more frequent. Severe summer weather includes thunderstorms, wind, hail, lightning, tornadoes, and microbursts that typically occur between May and October of each year. Further details on severe summer weather hazards are profiled below.

Severe Summer Weather

A severe thunderstorm is defined by the National Weather Service as a thunderstorm that produces wind gusts at or greater than 58 mph (50 knots), hail 1-inch or larger, and/or tornadoes. Thunderstorms can also produce intense downbursts, lightning, and microburst wind. Strong winds can occur outside of thunderstorms when the overall weather conditions are favorable. Thunderstorms can produce deadly and damaging tornadoes. However, tornadoes are not common in Stillwater County.

A microburst is a very localized column of sinking air, producing damaging divergent and straight-line winds at the surface that are similar to, but distinguishable from, tornadoes. The scale and suddenness of a microburst makes it a great danger to aircraft due to the low-level wind shear caused by its gust front, with several fatal crashes having been attributed to the phenomenon over the past several decades. Microbursts in forested regions have flattened acres of standing timber.

Lightning is an electrical discharge between positive and negative regions of a thunderstorm. Lightning is one of the more dangerous weather hazards in the U.S. and in Montana. Each year, lightning is responsible for deaths, injuries, and millions of dollars in property damage, including damage to buildings, communications systems, power lines, and electrical systems. Lightning also causes forest and brush fires, and deaths and injuries to livestock and other animals.

Extreme heat is defined as temperaturesthat hover 10 degrees or more above the average high temperature for the region and last for several weeks. Heat kills by taxing the human body beyond its abilities. In a normal year, about 175 Americans succumb to the demands of summer heat.

The National Weather Service provides short-term forecasts and warnings of severe summer weather to the public by producing regularly scheduled severe weather outlooks and updates, as shown in **Table 4.3-1.**

Table 4.3-1. Warning and Advisory Criteria for Severe Summer Weather

Summer Weather	Weather Advisory
Heat Advisory	Issued within 12 hours of the onset of extremely dangerous heat conditions. The general rule of thumb for this Advisory is when the maximum heat index temperature is expected to be 100° or higher for at least 2 days, and night time air temperatures will not drop below 75°;
Excessive Heat Watch	Issued when conditions are favorable for an excessive heat event in the next 24 to 72 hours. A Watch is used when the risk of a heat wave has increased but its occurrence and timing is still uncertain.
Excessive Heat Warning	Issued within 12 hours of the onset of extremely dangerous heat conditions; i.e. when the maximum heat index temperature is expected to be 105° or higher for at least 2 days and night time air temperatures will not drop below 75°
Hazardous Weather Outlook	Hazardous weather outlooks alert the public to the possibility for severe weather in the area from one to seven days in advance.
Severe Thunderstorm Watch	Issued when conditions for severe thunderstorms appear favorable for an area over the next several hours. Watches are typically in effect for 4-6 hours.
Severe Thunderstorm Warning	Issued when Doppler radar indicates or the public reports a thunderstorm with wind gusts of 58 mph or greater and/or hail 1-inch or larger in diameter. The warning is usually valid for 30-60 minutes.

Table 4.3-1. Warning and Advisory Criteria for Severe Summer Weather

Summer Weather	Weather Advisory
High Wind Watch	Issued when conditions are favorable for non-thunderstorm sustained winds of 40 mph or greater or gusts of 58 mph or greater for a period of one hour or more, but the timing, location, and/or magnitude are still uncertain.
High Wind Warning	Issued when non-thunderstorm sustained winds of 40 mph or greater or gusts of 58 mph or greater for a period of one hour or more are expected.

Source: National Weather Service, 2021.

There have been no federal disaster or state emergency declarations for severe summer weather in Stillwater County. However, since the 2015 PDM Plan was completed, numerous incidents of severe summer weather have affected the county, as summarized in **Table 4.3-2**.

Table 4.3-2. Stillwater County Severe Summer Weather Reports (~May-October)

Date	Location	Event	Magnitude	Date	Location	Event	Magnitude
6/9/2001	Rapelje	Hail	1 inch	9/7/2013	Rapelje	Tstm Wind	52 knots
6/17/2001	Absarokee	Hail	1.25 inch	5/18/2014	Reed Pt	Hail	1.75 inch
6/26/2001	Park City	Hail	1 inch	6/10/2014	Rapelje	Hail	1 inch
7/13/2001	Rapelje	Hail	1 inch	7/22/2014	Absarokee	Tstm Wind	61 knots
7/19/2001	Rapelje	Hail	1.75 inch	10/15/2014	Stillwater Co.	High Wind	39 knots
7/26/2001	Nye	Hail	1 inch	6/16/2015	Rapelje	Hail	1.75 inch
7/27/2001	Molt	Tstm Wind	70 knots	6/18/2015	Absarokee	Hail	1.25 inch
5/14/2002	Stillwater Co.	High Wind	60 knots	10/11/2015	Stillwater Co.	High Wind	52 knots
6/29/2002	Reed Pt	Tstm Wind	60 knots	5/21/2016	Columbus	Hail	1 inch
6/22/2003	Molt	Hail	1 inch	7/4/2016	Rapids	Tstm Wind	50 knots
7/26/2003	Columbus	Hail	1 inch	7/10/2016	Fishtail	Tstm Wind	50 knots
6/22/2004	Reed Pt	Hail	1.75 inch	7/15/2016	Absarokee	Hail	1 inch
6/15/2005	Rapelje	Tstm Wind	62 knots	10/14/2016	Stillwater Co.	High Wind	74 knots
6/21/2005	Absarokee	Tstm Wind	70 knots	10/31/2016	Stillwater Co.	High Wind	50 knots
6/23/2005	Park City	Hail	1 inch	5/7/2017	Reed Pt	Hail	1 inch
6/27/2005	Reed Pt	Hail	1.25 inch	7/16/2017	Molt	Tstm Wind	52 knots
7/15/2005	Park City	Tstm Wind	60 knots	10/18/2017	Stillwater Co.	High Wind	77 knots
8/9/2005	Absarokee	Tstm Wind	65 knots	10/20/2017	Stillwater Co.	High Wind	51 knots
8/11/2005	Molt	Tornado	-	5/9/2018	Fishtail	Hail	1.25 inch
7/12/2006	Park City	Tstm Wind	70 knots	5/22/2018	Columbus	Hail	1 inch
8/17/2006	Rapelje	Hail	1 inch	5/26/2018	Reed Pt	Hail	1 inch
5/13/2007	Rapelje	Hail	1.75 inch	6/26/2018	Columbus	Hail	1 inch
7/14/2007	Reed Pt	Hail	1.75 inch	7/2/2018	Absarokee	Hail	1 inch
8/4/2007	Rapelje	Tstm Wind	56 knots	7/21/2018	Molt	Tstm Wind	59 knots
6/25/2008	Molt	Hail	1 inch	7/26/2018	Reed Pt	Hail	1.75 inch
7/1/2008	Columbus	Tstm Wind	61 knots	7/27/2018	Columbus	Hail	1.75 inch
6/30/2009	Columbus	Tstm Wind	61 knots	7/28/2018	Reed Pt	Hail	1.25 inch
8/13/2009	Rapelje	Tstm Wind	53 knots	8/2/2018	Columbus	Tstm Wind	53 knots
6/16/2010	Columbus	Hail	1.75 inch	5/26/2019	Rapelje	Hail	1.5
7/31/2010	Molt	Tstm Wind	52 knots	6/30/2019	Reed Pt	Hail	1 inch
6/2/2011	Rapids	Tstm Wind	52 knots	7/6/2019	Dean	Hail	1 inch
6/6/2011	Molt	Funnel Cloud	-	7/11/2019	Rapelje	Hail	1 inch
6/6/2011	Columbus	Hail	2.75 inch	7/13/2019	Columbus	Hail	1 inch
6/24/2011	Columbus	Hail	1 inch	7/14/2019	Columbus	Hail	1.25 inch
7/3/2011	Wheat Basin	Hail	1 inch	8/11/2019	Molt	Hail	2.75 inch
7/6/2011	Reed Pt	Hail	1.75 inch	10/22/2019	Stillwater Co.	High Wind	54 knots
7/7/2011	Molt	Hail	1.75 inch	5/6/2020	Stillwater Co.	High Wind	50 knots
7/8/2011	Reed Pt	Tstm Wind	53 knots	5/19/2020	Rapelje	Hail	1.25 inch
8/29/2011	Rapids	Tstm Wind	55 knots	7/1/2020	Fishtail	Tstm Wind	51 knots
6/5/2012	Stillwater Co.	High Wind	65 knots	7/9/2020	Reed Pt	Hail	0.88 inch

Table 4.3-2. Stillwater County Severe Summer Weather Reports (~May-October)

Date	Location	Event	Magnitude	Date	Location	Event	Magnitude
6/12/2013	Fishtail	Tstm Wind	55 knots	8/3/2020	Columbus	Tstm Wind	52 knots
6/13/2013	Reed Pt	Hail	1.75 inch	10/10/2020	Stillwater Co.	High Wind	54 knots
6/19/2013	Columbus	Hail	1.75 inch	10/13/2020	Stillwater Co.	High Wind	53 knots
6/22/2013	Reed Pt	Hail	1 inch	10/30/2020	Stillwater Co.	High Wind	54 knots
6/29/2013	Columbus	Tstm Wind	52 knots	6/10/2021	Stillwater Co.	Hail	0.88 inch
8/1/2013	Rapelje	Hail	1 inch	6/10/2021	Absarokee	High Wind	63 knots

Source: NCDC, 2021. Notes: Tstm = Thunderstorm

The highest wind speeds reported during summer in Stillwater County were 77 knot (83 mph) thunderstorm winds in October 2017, with 70 knot (80 mph) winds reported on several occasions. Columbus had 2.75 inch hail in 2011 as did Molt in 2019. July 20, 2021 saw a record-breaking temperature of 111 degrees in Columbus.

The Benbow area of Stillwater County has experienced severe winds and timber damage similar to a microburst. A wind event in 2007 damaged an estimated 20,000 acres of forested land, creating a large-scale fuels hazard. Areas such as West Fishtail Creek and Rocky Creek near Dean experienced extensive damage with some areas sustaining 80-90 percent tree mortality.

Table 4.3-3 presents temperature extremes in Stillwater County. Unexpected Weather Event projections outlined in the Montana MHMP (DES, 2018) illustrate how extended heat may impact Stillwater County in the future. According to data from NOAA and FEMA, Stillwater County is projected to have an average 31 days/year over 95 degrees by mid-century and 41 days/year over 95 degrees by the end of the century. (See *Section 3.2* for details).

Table 4.3-3. Stillwater County Summer Temperature Records

Summer Weather		Columbus (1930-2012)	Nye (1905-2012)
May	Highest Temperature	96° F – 5/27/1934	94° F – 5/31/1984
	Avg. # Days over 90° F	0.7 days	0.2 days
June	Highest Temperature	102° F – 6/26/1936	99° F – 6/29/2007
	Avg. # Days over 90° F	3.5 days	1.3 days
July	Highest Temperature	109° F – 7/21/1931	104° F – 7/12/2002
	Avg. # Days over 90° F	14.5 days	6.9 days
August	Highest Temperature	106° F – 8/10/1935	99° F – 8/12/1996
	Avg. # Days over 90° F	12.5 days	5.0 days
September	Highest Temperature	102° F – 9/4/1950	96° F – 9/3/1998
	Avg. # Days over 90° F	2.4 days	1.3 days
October	Highest Temperature	92° F – 10/1/1992	90° F – 10/3/1987
	Avg. # Days over 90° F	0 days	0.1 days

Source: Western Regional Climate Center, 2021.

Drought

Drought is an extended period of unusually dry weather and is a special type of disaster because its occurrence does not require evacuation of an area nor does it constitute an immediate threat to life or property. People are not suddenly rendered homeless or without food and clothing. The basic effect of a drought is economic hardship, but it does, in the end, resemble other types of disasters in that victims can be deprived of their livelihoods and communities can suffer economic decline.

The effects of drought become apparent when they are in longer duration because more and more moisture-related activities are affected. Non-irrigated croplands are most susceptible to moisture shortages. Rangeland and irrigated agricultural lands do not feel the effects as quickly as the non-irrigated, cultivated acreage, but their yields can also be greatly reduced due to drought.

Typically, droughts are not declared disasters in the same way as a Presidential Disaster Declaration; rather, they are declared by the Secretary of the Department of Agriculture. Conservation Reserve Program (CRP) grazing may be opened to livestock owners for feed but other than this, the only real help for producers and growers is the fact that federal low interest loans are made available.

In periods of severe drought, range fires can destroy the economic potential of the agricultural industry, and wildlife habitat in, and adjacent to, the fire areas. Under extreme drought conditions, lakes, reservoirs, and rivers can be subject to severe water shortages. Insect infestation is an additional hazard resulting from drought. **Table 4.3-4** presents the National Weather Service warnings and advisories that relate to drought.

Table 4.3-4. Warning and Advisory Criteria for Drought

Weather Warning	Warning Description
Blowing Dust Advisory	Issued for widespread or localized blowing dust reducing visibilities to less than a mile but greater than ¼ mile with sustained winds of 25 mph or greater.
Dust Storm Warning	Issued when widespread or localized blowing dust reduces visibilities to less than ¼ mile with sustained winds of 25 mph or greater.
Heat Advisory	Issued within 12 hours of the onset of extremely dangerous heat conditions; i.e. when the maximum heat index temperature is expected to be 100° or higher for at least 2 days, and night time air temperatures will not drop below 75°.
Excessive Heat Warning	Issued within 12 hours of the onset of extremely dangerous heat conditions; i.e. when the maximum heat index temperature is expected to be 105° or higher for at least 2 days and night time air temperatures will not drop below 75°.

Source: National Weather Service, 2021.

The National Drought Mitigation Center identifies Montana as a drought-prone state. Temperatures can reach 100°F in the summer with extremely low humidities and high winds. Such dry, hot conditions contribute to drought conditions. The history of drought in Montana, as presented in the State of Montana Natural Hazards Mitigation Plan (DES, 2001) is summarized below.

In the 1930's, the "Dust Bowl" drought affected the State of Montana, including Stillwater County. This nationwide drought produced erosion problems in the creation of dust storms throughout the state.

Drought struck Montana again in 1961, and by July, the State's Crop and Livestock Reporting Service called it the worst drought since the 1930's. Better conservation practices such as strip cropping were used to lessen the impacts of the water shortages. Five years later in 1966, the entire state was experiencing yet another episode of drought. Although water shortages were not as great as in 1961, a study of 10 weather recording stations across Montana showed all had recorded below normal precipitation amounts for a 10-month period.

Then in the 1970's, a seven-month survey ending in May of 1977 estimated that over 250,000 acres of Montana farmland had been damaged by winds. Inadequate crop cover and excessive tillage practices had resulted in

exaggerated soil damage due to low soil moisture. The State of Montana began taking protective measures to conserve water.

Montana was severely affected by drought again in 1985 and received a federal drought disaster declaration. For a typical 2,500-acre Montana farm/ranch, the operator lost more than $100,000 in equity over the course of that year. The state's agriculture industry lost nearly $3 billion in equity. History remembers the 1988 drought as the year fire burned through almost 800,000 acres of Yellowstone National Park, but it was also a brutal year for Montana's dryland farmers.

Montana had drought conditions from 2000 through 2008 and received a total of $152.4 million in disaster assistance from the Farm Service Agency in 2004, 2005, and 2006.

The drought of 2017 was of epic proportions stretching 680 miles west to east across the state. This was the first summer in 10 years that so much of the state experienced drought at the same time and the first year since 2004 that more than 10 percent of the state was in extreme drought. The summer of 2017 was the second warmest on record since 1950 at 4 degrees above average, and the persistent high temperatures coupled with the record lowest rainfall in July and August shifted the relatively wet conditions of spring into extreme drought by mid-summer. The speed of the transition from wet to dry was so rapid that the term "flash drought" has been coined. (Billings Gazette, *Montana Drought Drives Cattle to Market Early*, October 14, 2017; Billings Gazette, *Nearly all of Montana is in Drought*, August 19, 2017; Bozeman Daily Chronical, *The Worst Drought We've Ever Had: Farmers, Ranchers Across the State Struggle with Historic Dry Spell*, September 3, 2017).

Then Governor Bullock signed an Executive Order declaring a drought disaster in eastern and central Montana and stated that the drought had caused "significant and widespread injury to agricultural crops, including livestock forage, imposing economic hardships on Montana's farmers and ranchers". USDA authorized emergency grazing on CRP lands stating, "Due to reduced availability of forage, ranchers in the hardest hit locations have already been culling their herds. Without alternative forage options like grazing CRP lands, livestock producers are faced with the economically devastating potential of herd liquidation."

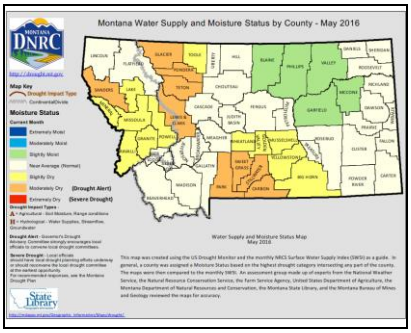
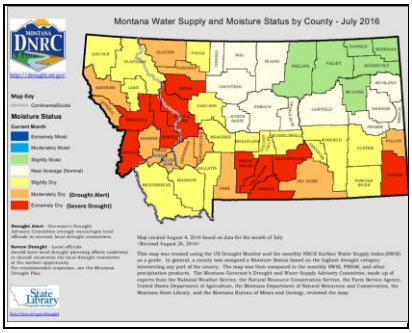
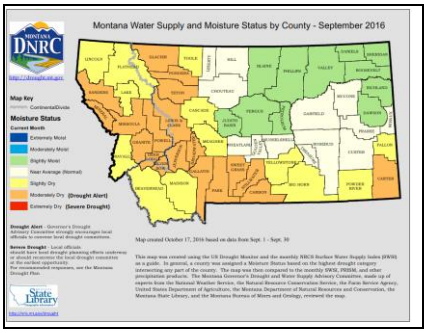
The drought of 2021 is being tagged "historic". By July 27th, 100 percent of the state was either abnormally dry or in a state of exceptional drought. Dry conditions during fall 2020 and limited snowpack over the winter, coupled with extended temperatures over 90 degrees during July, put the state in significant drought. The state has "substantially worse" drought conditions than in 2017, because those 2017 conditions didn't arrive until the end of August. Many cities deployed mitigation plans which put in place time-of-day and day-of-week watering restrictions. The forecast for months ahead showed little sign of relief. Conditions already caused total crop failures, dried out stock ponds, and a grasshopper population that's reducing hopes some producers had of eking out a crop. (Helena Independent Record, *July Drought Rages on as Montana Cities Deploy Mitigation Plans*, July 28, 2021). The state, which normally ranks third in the nation for wheat production, has suffered steep declines in yield as nearly 99 percent of Montana is in severe to exceptional drought in the final weeks of harvest. (Billings Gazette, *Cutting Their Losses*, August 26, 2021.)

In coordination with the Montana Governor's Drought and Water Supply Advisory Committee, the Montana State Library publishes monthly maps of moisture status by county. This webpage allows users to easily download, view, and compare moisture status maps between months and years beginning in 2002. New maps are published approximately the first half of each month.

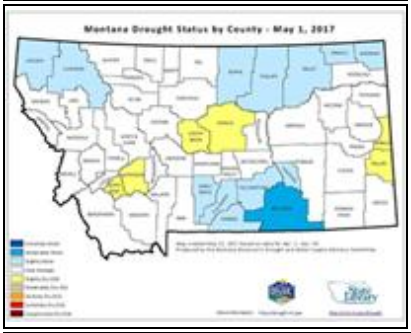
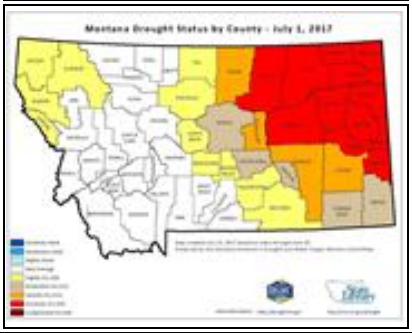
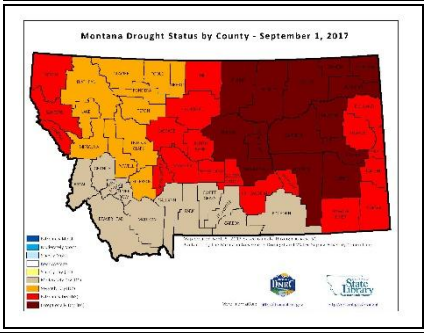
Table 4.3-5 shows the Montana drought status since the last Plan. **Table 4.3-6** summarizes drought conditions in Stillwater County from 2002 to 2019. Since the Stillwater County PDM Plan was completed in 2015, severe drought conditions impacted the county in 2016 and 2021. U.S. Department of Agriculture Disaster Designations were declared in Stillwater County in 2012, 2013, 2016, 2017, and 2021.

Table 4.3-5. Montana Drought Status; 2016-2021

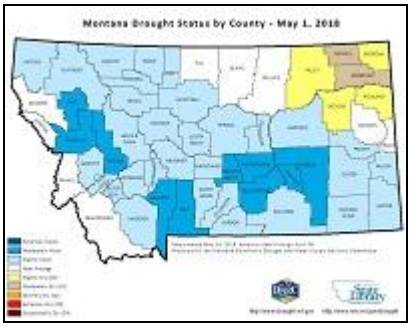
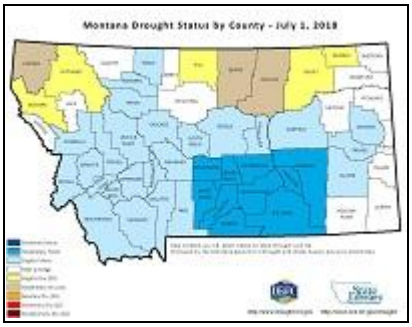
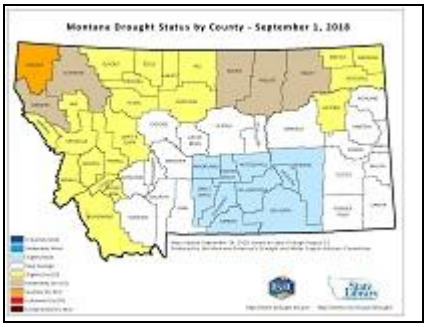
2016 Montana County Drought Status

May	July	September
		

2017 Montana County Drought Status

May	July	September
		

2018 Montana County Drought Status

May	July	September
		

2019 Montana County Drought Status

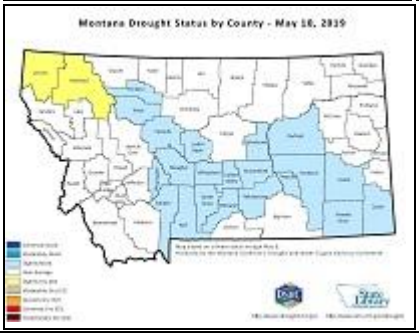
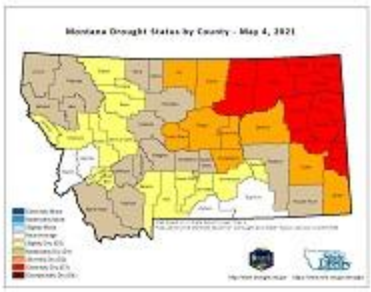
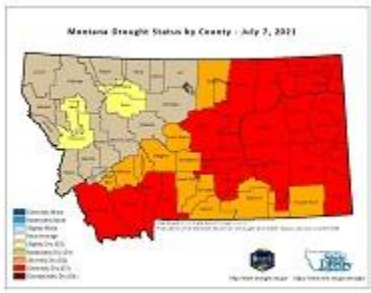
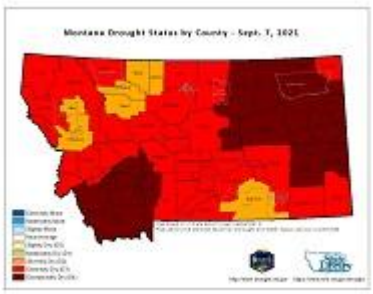
May	July	September
		

Table 4.3-5. Montana Drought Status; 2016-2021

2020 Montana County Drought Status		
May	July	September
		
2021 Montana County Drought Status	**2021 Montana County Drought Status**	**2021 Montana County Drought Status**
May	**July**	**September**
		

Federal agencies have mobilized to provide improved information and data, emergency and planning assistance, landscape-scale land management improvements, and investments in new technologies and approaches to water resource management. Continued drought conditions in the West and projections of more extreme droughts in the future underscore the urgency to pursue long term solutions for protecting our water resources and the communities and ecosystems that depend on them. The State of Montana has established a Drought Advisory Committee and developed a Drought Plan to help mitigate the drought hazard.

Table 4.3-6. Stillwater County Drought Summary

Moisture	Alerts	2002	2003			2004			2005			2006			2007			2008			2009			2010		
		October	May	July	Sept	May	July	Sept	May	July	Sept	May	July	Sept	May	July	Sept	May	July	Sept	May	July	Sept	May	July	Sept
No Drought	Moist																									
No Drought																										
Slightly Dry																										
Moderately Dry	Drought Alert																									
Severely Dry	Severe Drought																									
Extremely Dry																										

Moisture	Alerts	2011			2012			2013			2014			2015			2016			2017			2018			2019		
		May	July	Sept	May	July	Sept	May	July	Sept	May	July	Sept	May	July	Sept	May	July	Sept	May	July	Sept	May	July	Sept	May	July	Sept
Extremely Moist																												
Moderately Moist																												
Slightly Moist																												
Near Average	Normal																											
Slightly Dry																												
Moderately Dry	Drought Alert																											
Extremely Dry	Severe Drought																											

Vulnerability and Area of Impact

Based on review of historic weather data, all of Stillwater County has been classified with a uniform risk for severe summer weather events. Structures, utilities, and vehicles are most at risk from the wind component of these storms, with crops and livestock being additionally threatened by hail.

Extended heat during summer months has become unprecedented. For the physically and socially vulnerable, heat can prove very dangerous and even fatal. Some populations do not have cooling program capabilities like air conditioned buildings and public swimming pools.

Drought affects all facets of our society, from food production to water quality to public health, and there is a growing need to help communities, agriculture, businesses, and individuals threatened by drought to plan accordingly. From 1980-2000, major droughts and heat waves within the U.S. alone resulted in costs exceeding $100 billion. Severe droughts are projected for the next several decades, impacting the nation's communities and economy (NDRP, 2018).

Unlike many other events, drought evolves slowly, and therefore, the direct impact to the population (i.e. loss of life, injuries) and structure damage would be low. Drought, however, can have significant impacts on drinking water security and negatively affect the county's agricultural economy. Stillwater County communities rely on surface water for public water supplies. A reduction in river flows could cause water intake infrastructure to be compromised resulting in water shortages. Reduced irrigation could result in loss of pasture and food supply for livestock. These losses would be in addition to those losses associated with lower crop yields due to drought conditions.

Another major impact of drought is to the natural resources of the area. As river and stream levels drop, fish populations and other natural resources are impacted. Montana has many blue-ribbon trout streams, lakes and reservoirs that support a sport fishing industry. The state's economy is dependent on tourism, many of whom come to the state for fishing.

A hazard directly related to drought is wildfire. With increased temperatures and drought conditions, moisture content in vegetation in reduced making fuel for wildfire. Please refer to the hazard profile in *Section 4.2* for additional information on wildfire.

Probability and Magnitude

Table 4.3-7 presents severe summer weather events with reported damages in Stillwater County.

Table 4.3-7. Stillwater County Severe Summer Weather Events with Damages

Date	Injuries	Fatalities	Property Damage	Crop Damage	Remarks
5/1961	0	0	$1,386	$4,686	Severe Storm/Hail/Thunderstorm
5/1961	0	0	$918	$0	Wind
6/1961	0	0	$312	$3,124	Severe Storm/Hail/Wind/Thunderstorm
6/1962	0	0	$4,361	$43,615	Hail
5/1964	0	0.02	$7,868	$0	Wind
7/1964	0	0	$0	$885	Severe Storm/Hail/Thunderstorm
8/1964	0	0	$0	$1,770	Lightning
7/1968	0	0	$0	$473,122	Hail
6/1970	0	0	$36,115	$36,115	Hail/Wind
10/1971	0	0	$11,615	$11,615	Severe Storm/Thunderstorm
6/1972	0	0	$6,060	$0	Severe Storm/Thunderstorm
6/1973	0	0	$45	$449	Hail/Wind
8/1975	0	0	$255	$2,550	Hail/Wind
9/1983	0	0	$3,480	$348	Severe Storm/Thunderstorm
7/1986	0	0	$100	$10,015	Severe Storm/Hail/Wind/Thunderstorm
7/1987	0	0	$0	$11,595	Hail
10/1989	0	0	$89	$0	Wind
5/1991	0	0	$967	$967	Hail
10/1991	0	0	$189,625	$0	Wind
7/1992	0	0	$939	$939	Hail
6/1994	0	0	$10,000	$0	Severe Storm/Hail/Thunderstorm
7/1998	0	0	$25,000	$500,000	Severe Storm/Wind/Thunderstorm
7/2000	0	0	$30,596	$0	Wind
TOTAL	**0**	**0.02**	**$329,731**	**$1,101,795**	

Source: SHELDUS, 2017 (adjusted to 2020 dollars); NCDC, 2021

Windstorms can affect areas with significant tree stands, as well as areas with exposed property, major infrastructure, and aboveground utilities. Severe hailstorms can also cause considerable damage to buildings and automobiles, but rarely result in loss of life. Nationally, hailstorms cause nearly $1 billion in property and crop damage annually.

Annual loss was computed for the severe summer weather hazards in Stillwater County using SHELDUS data and the formula: Frequency x Magnitude x Exposure = Annual Loss, as further explained in *Section 4.1.6*. **Table 4.3-8** presents the results of these calculations.

Table 4.3-8. Stillwater County Severe Summer Weather Annual Loss

No. of Events	Period of Record (Yrs)	Frequency	Property Damage	Magnitude	Exposure	Annual Loss
88	20	4.4	$329,731	0.003069%	$1,220,878,170	$16,487

Drought affects all facets of society, from food production to water quality to public health, and there is a growing need to help communities, agriculture, businesses, and individuals threatened by drought to plan accordingly. From 1980-2000, major droughts and heat waves within the U.S. alone resulted in costs exceeding $100 billion. In 2012, approximately two-thirds of the continental U.S. was affected by chronic drought. Severe droughts are projected for the next several decades, impacting the nation's communities and economy (NDRP, 2016).

Drought impacts include crop losses and decrease in livestock inventory. The value of inventory on hand may decrease because producers are forced to sell rather than purchase expensive feed. Drought can dry up of reservoirs and other water sources for people and livestock. Agriculture supports Main Street businesses which experience indirect economic effects from drought. Drought can increase the chances of wildland fire. Multi-year droughts have cost Stillwater County many millions of dollars.

The National Drought Mitigation Center tracks indemnity payments for losses suffered due to drought on a county basis. **Table 4.3-9** presents drought damages for a 25-year period (1989 to 2014) for Stillwater County and the State of Montana.

Table 4.3-9. Drought Insurance Claims; Stillwater County 1989 - 2014

Year	Montana	Stillwater Co.	Year	Montana	Stillwater Co.	Year	Montana	Stillwater Co.
1989	$14,361,948	$16,467	1998	$18,201,060	$50,935	2007	$22,015,676	$28,716
1990	$29,146,575	$97,455	1999	$19,189,328	$199,918	2008	$74,979,811	$337,501
1991	$2,775,746	$20,658	2000	$44,989,149	$1,018,941	2009	$30,435,526	$154,966
1992	$37,767,835	$3,945	2001	$131,976,513	$1,448,732	2010	$5,289,266	$145,848
1993	$344,432	$2,759	2002	$108,139,519	$1,964,556	2011	$52,075,321	$0
1994	$5,539,598	$1,038	2003	$41,148,170	$643,017	2012	$10,055,101	$1,440,787
1995	$2,413,758	$288	2004	$29,427,194	$1,208,894	2011	$11,670,134	$384,538
1996	$10,637,521	$13,673	2005	$5,905,724	$42,861	2014	$5,289,266	$28,043
1997	$3,830,310	$2,279	2006	$41,483,327	$477,972	**TOTAL**	**$759,087,808**	**$9,734,787**

Source: National Drought Mitigation Center 2021; https://drought.unl.edu/droughtplanning/DroughtImpacts/IndemnityData.aspx

Table 4.3-10 shows how drought has impacted the yield of winter wheat in Stillwater County for four documented drought years. The year 2018, considered a non-drought year, is used for comparison purposes and prices are adjusted for inflation. The analysis shows that drought has caused over $7 million in lost winter wheat revenue in just four drought years in Stillwater County.

Table 4.3-10. Estimate of Economic Loss from Drought; Stillwater County

Year	Winter Wheat					
	Winter Wheat Yield (bu/acre)	Winter Wheat (acres harvested)	Price Per Bushel (2020$)	Economic Value in 2020$	Drought Yield Reduction	Drought Loss in Adjusted 2020 $
2018 ND	36.4	20,100	$5.10	$3,731,364.00		
2012	20				45.05%	$1,681,164
2002	16				56.04%	$2,091,204
2001	16				56.04%	$2,091,204
2000	20				45.05%	$1,681,164
					TOTAL	**$7,544,736**

Source: USDA National Agricultural Statistics Service, 2021. Notes: ND = No Drought

NOAA's Paleoclimatology Program has studied drought by analyzing records from tree rings, lake and dune sediments, archaeological remains, historical documents, and other environmental indicators to obtain a broader picture of the frequency of droughts in the United States. According to their research, "...paleoclimatic data suggest that droughts as severe as the 1950's drought have occurred in central North America several times a century over the past 300-400 years, and thus we should expect (and plan for) similar droughts in the future. The paleoclimatic record also indicates that droughts of a much greater duration than any in the 20th century have occurred in parts of North America as recently as 500 years ago." Based on this research, the 1950's drought situation could be expected approximately once every 50 years or a 20 percent

chance every 10 years. An extreme drought, worse than the 1930's "Dust Bowl" has an approximate probability of occurring once every 500 years or a 2 percent chance of occurring each decade (NOAA, 2004).

Severe summer weather occurs in Stillwater County multiple times each year. Therefore, the probability of a severe storm in either the winter or summer is rated as "highly likely". Based on historic conditions, the probability of future drought events in Stillwater County are ranked as "likely", occurring more than once every 10 years but not every year.

Future Development

The State of Montana has adopted the 2012 International Building Codes (IBC) which include a provision that buildings must be constructed to withstand a wind load of 75 mph constant velocity and three second gusts of 90 mph and must be designed to withstand a snow load of 30 pounds per square foot minimum. The IBC does not cover single-family residences.

The State of Montana has adopted the 2012 International Residential Code (IRC) for one and two-family residences and townhouses. Local jurisdictions (cities, counties and towns) can elect to become certified to take on enforcement of single-family residences. Neither Stillwater County nor the City of Columbus are certified to enforce building codes and therefore, rely on the state to inspect new commercial and multi-family structures.

Drought could have an effect on future development with regards to drinking water availability. New connections to the municipal water supply or new domestic water wells could use up more of the surface and groundwater resource, particularly during periods of drought.

Unexpected Weather Event

The frequency of severe weather events has increased steadily over the last century. The number of weather-related disasters during the 1990s was four times that of the 1950s, and cost 14 times as much in economic losses. Historical data shows that the probability for severe weather events increases in a warmer climate. There has been a sizable upward trend in the number of storms causing large financial and other losses.

According to the National Unexpected Weather Event Assessment (2018), Unexpected Weather Event can and has altered the risk of certain types of extreme weather events. The number of heat waves has been increasing in recent years with the number being almost triple the long-term average. These increases in extreme heat will have many negative consequences, including increases in surface water losses, heat stress, and demand for air conditioning. Montana has seen an uptick in average temperature of about 2 °F in the last 50 years, while precipitation has stayed largely the same.

Rising temperatures are leading to increased demand for water and energy. In parts of the region, this will constrain development, stress natural resources, and increase competition for water among communities, agriculture, energy production, and ecological needs. Changes in average temperatures can impact vegetation growth and the location and extent of pests. Higher temperatures may also lead to increases in wildfire occurrences. Extreme heat will have a profound effect on vulnerable populations, as most Montana homes do not have air conditioning.

Changing extremes in precipitation are projected across all seasons, including higher likelihoods of both increasing heavy rain. Spring precipitation is projected to increase in the northern states of the Great Plains, relative to the 1971-2000 average. Projected changes in summer and fall precipitation are small; however, the number of days with heavy precipitation is expected to increase by mid-century. For other types of extreme

weather events, such as tornadoes and severe thunderstorms, more research is needed to understand how Unexpected Weather Event will affect them.

The effects of Unexpected Weather Event can harm agricultural activities, both crops and livestock. The changes in temperature and precipitation brought on by Unexpected Weather Event can make it harder to grow some crops. Evaporation and the higher rate at which plants lose moisture through their leaves both increase with temperature. Unless higher evapotranspiration rates are matched by increases in precipitation, environments will tend to dry, promoting drought conditions. Intense rains can increase runoff and deprive plants of nutrient-rich topsoil and changes in temperatures may cause crops to mature earlier, which can expose them to harsh weather. Warmer temperatures can introduce new agricultural pests to the region or make conditions better for pests already present, including weeds and invasive plants that can crowd out crops. Maintaining agricultural activities on marginal lands may no longer be sustainable (FEMA, 2016).

Maintaining stream flows during warm season months will likely necessitate reconsideration of water storage practices and reservoir management. Changing seasonality of water availability will likely put additional stress on the water rights system, making it difficult to access water at crucial times (Whitlock, et.al, 2017).

Population exposure and vulnerability to severe summer weather and drought are likely to increase as a result of Unexpected Weather Event. Severe weather events may occur more frequently which would lead to increased exposure and vulnerability. Although all people may be affected by the health-related impacts of Unexpected Weather Event, the elderly, young children, and people with weakened immune systems are often the most susceptible. Some people without access to backup water supplies may suffer water shortages and a greater number of people may need to engage in behavior change such as water conservation.

Property exposure and vulnerability may increase as a result of increased severe summer weather and drought resulting from Unexpected Weather Event. Increased structure damage from high winds and hail could result as well as damage to crops and landscaping. Secondary impacts, such as wildfire, may increase and threaten structures.

Critical facility exposure and vulnerability are unlikely to increase as a result of Unexpected Weather Event impacts associated with severe summer weather and drought; however, critical facility owners and operators may experience more frequent disruption to the services they provide. For example, extreme heat can decrease the effectiveness of electrical equipment, including power lines, which can lead to blackouts during very hot conditions. An increase in requests for medical assistance during a heat wave may challenge emergency response capabilities. The need for community cooling centers could result in an increase in number of critical facilities.

4.4 Severe Winter Weather

CPRI SCORES
SEVERE WINTER WEATHER = 3.15
HIGHWAY ACCIDENTS =3.05

Description and History

Winter weather hazards typically occur from November through April in Stillwater County. Snow, blizzards, extended cold and high winds frequently occur together but also occur independent of one another during these months. Highway accidents due to severe weather are also included in this hazard profile as they often occur due to ice and blowing snow.

Winter storms and blizzards follow a seasonal pattern that begins in late fall and lasts until early spring. These storms have the potential to destroy property and kill livestock and people. Winter storms may be categorized as sleet, ice storms or freezing rain, heavy snowfall or blizzards, and low temperatures. Blizzards are most commonly connected with blowing snow and low visibility. Winter also brings sustained straight-line winds that can be well over 50 mph.

A severe winter storm is generally a prolonged event involving snow or ice and extreme cold. The characteristics of severe winter storms are determined by the amount and extent of snow or ice, air temperature, wind speed, and event duration. A combination of temperatures to 30 below zero, snow conditions and high winds can close roads, threaten disruption of utilities and regional telecommunications, limit access to rural homes, impede emergency services delivery and close businesses. Such storms also create hazardous travel conditions, which can lead to increased vehicular accidents and threaten air traffic. Additionally, motorists stranded due to closed roads and highways may present sheltering needs.

Avalanches occur when a wall of deep snow breaks loose from a steep slope. The snow picks up speed as it rushes down the mountain and can pick up anything that might be in its path including rocks, trees, and people. Avalanche danger depends on the depth of the snow, on the instability of the snowpack, and on the degree of slope. Avalanches within the county have occurred in remote areas. Few instances of human involvement have been reported.

The National Weather Service provides short-term forecasts of hazardous weather to the public by producing regularly scheduled severe weather outlooks and updates on various forms of hazardous weather including blizzards and wind chill. Warning and Advisory Criteria for winter weather is presented in **Table 4.4-1**.

Table 4.4-1. Warning and Advisory Criteria for Severe Winter Weather

Winter Weather	Weather Advisory
Winter Storm Watch	Issued to give the public 12-48 hours of advance notice of the potential for snow 6 inches or more in 12 hours or 8 inches or more in 24 hours AND sustained or frequent wind gusts of 25 – 34 mph occasionally reducing visibilities to ¼ mile or less for three hours or more.
Winter Weather Advisory	Issued when a combination of winter weather elements that may cause significant inconvenien ces are occurring, imminent, or have a high probability of occurring.
Winter Storm Warning	Issued when snow 6 inches or more in 12 hours or 8 inches or more in 24 hours AND sustained or frequent wind gusts of 25-34 mph occasionally reducing visibilities to ¼ mile or less for three hours or more are occurring, imminent, or have a high probability of occurring.
Blizzard Watch	Issued to give the public 12-48 hours of advance notice of possible blizzard conditions (sustained winds or frequent gusts of 35 mph or greater and visibilities of less than a quarter mile from falling and/or blowing snow for 3 hours or more).
Blowing Snow Advisory	Issued for visibilities intermittently at or below ½ mile because of blowing snow.
Blizzard Warning	Issued when blizzard conditions (sustained winds or frequent gusts of 35mph or greater and visibilities of less than a quarter mile from falling and/or blowing snow for 3 hours or more) are occurring, imminent, or have a high probability of occurring.
Freezing Rain Advisory	Issued when an accumulation of ice will make roads and sidewalks slippery, but significant and damaging accumulations of ice are not expected.
Ice Storm Warning	Issued when a significant and damaging accumulation of ice is occurring, imminent or has a high probability of occurring.
Snow Advisory	Issued when snow accumulations of 2-5 inches in 12 hours are expected.

Table 4.4-1. Warning and Advisory Criteria for Severe Winter Weather

Winter Weather	Weather Advisory
Sleet Advisory	Issued when sleet accumulations causing hazardous conditions are expected.
Heavy Snow Warning	Issued when snow accumulations of 6 inches or more in 12 hours or 8 inches or more in 24 hours are expected.
Wind Chill Watch	Issued to give the public 12-48 hours advanced notice of the potential for wind chills of -40°F or colder with a wind speed of 10 mph or higher and a duration of 6 hours or more.
Wind Chill Advisory	Issued when wind chills of -20°F to -39°F with a wind speed of 10 mph or higher and a duration of 6 hours or more are expected.
Wind Chill Warning	Issued when wind chills of -40°F or colder with a wind 10 mph wind in combination with precipitation.

Source: National Weather Service, 2021.

Snowstorms and bitterly cold temperatures are common occurrences in Stillwater County and generally do not cause any problems as residents are used to winter weather and are prepared for it. Sometimes, however, blizzards can occur and overwhelm the ability to keep roads passable. Heavy snow and ice events also have the potential to bring down power lines and trees. Extreme wind chill temperatures may harm residents if unprotected outdoors or if heating mechanisms are disrupted. **Table 4.4-2** presents winter weather records for Columbus and Nye.

Table 4.4-2. Stillwater County Winter Weather Records

Winter Weather	Columbus (1930-2012)	Nye (1905-2012)
Lowest Temperature Recorded	-45°F – February 15, 1936	-40°F – December 24, 1983
Average # Days Dropping Below Freezing	183.6 days	176.8 days
Average # Days Staying Below Freezing	30.5 days	30.2 days
Average # Days Staying Below Zero	21.7 days	17.1 days
Average Annual Snowfall	36.0 inches	86.0 inches
Highest Annual Snowfall	83.7 inches - 1978	172.5 inches - 1991
Highest Monthly Snowfall	32.5 inches – April 1955	65.5 inches – April 1991

Source: Western Regional Climate Center, 2021.

There have been no federal disaster or state emergency declarations for severe winter weather in Stillwater County. However, since the 2015 PDM Plan was completed, numerous incidents of severe summer weather have affected the county, as summarized in **Table 4.4-3**.

Table 4.4-3. Stillwater County Severe Winter Weather Reports (~November-April)

Date	Event / Magnitude	Date	Event / Magnitude	Date	Event / Magnitude
1/4/2010	Winter Storm	1/13/2014	High Wind – 60 kts	11/1/2017	Winter Storm
1/5/2010	Winter Storm	1/15/2014	High Wind – 59 kts	11/2/2017	Winter Storm
1/22/2010	Winter Storm	1/29/2014	Winter Storm	12/22/2017	Winter Storm
2/13/2010	Winter Storm	2/12/2014	High Wind – 54 kts	12/27/2017	Winter Storm
3/29/2010	High Wind – 66 kts	2/16/2014	High Wind – 56 kts	12/29/2017	Winter Storm
3/30/2010	Heavy Snow	2/17/2014	High Wind – 65 kts	1/10/2018	Winter Storm
4/1/2010	Heavy Snow	2/22/2014	Winter Storm	1/11/2018	Winter Storm
4/28/2010	Heavy Snow	2/23/2014	Winter Storm	1/18/2018	Winter Storm
5/5/2010	Winter Storm	2/27/2014	Winter Storm	1/24/2018	High Wind – 65 kts
5/11/2010	Winter Storm	3/10/2014	Winter Storm	2/3/2018	Winter Storm
11/8/2010	Winter Storm	3/17/2014	Heavy Snow	2/7/2018	Winter Storm
11/14/2010	Winter Storm	3/29/2014	Winter Storm	2/14/2018	Winter Storm
11/18/2010	High Wind – 58 kts	3/30/2014	Winter Storm	2/16/2018	Winter Storm
11/23/2010	Winter Storm	4/12/2014	Winter Storm	2/18/2018	Winter Storm
11/25/2010	Blizzard	11/25/2014	Winter Storm	3/3/2018	Winter Storm
12/2/2010	Winter Storm	12/20/2014	Winter Storm	4/1/2018	Winter Storm
1/18/2011	Winter Storm	12/24/2014	High Wind – 69 kts	4/5/2018	Winter Storm
1/20/2011	Blizzard	1/2/2015	Winter Storm	11/23/2018	Winter Storm
2/4/2011	Winter Storm	1/3/2015	Winter Storm	12/14/2018	High Wind – 65 kts

Table 4.4-3. Stillwater County Severe Winter Weather Reports (~November-April)

Date	Event / Magnitude	Date	Event / Magnitude	Date	Event / Magnitude
2/12/2011	High Wind – 75 kts	1/4/2015	Winter Storm	1/23/2019	Winter Storm
3/13/2011	High Wind – 62 kts	1/11/2015	Winter Storm	2/3/2019	Winter Storm
3/16/2011	Winter Storm	2/5/2015	High Wind – 78 kts	2/23/2019	Winter Storm
3/21/2011	Heavy Snow	2/15/2015	Heavy Snow	4/10/2019	Winter Storm
3/22/2011	Heavy Snow	2/20/2015	Winter Storm	4/28/2019	High Wind – 51 kts
4/4/2011	Winter Storm	3/2/2015	Winter Storm	5/21/2019	Winter Storm
4/7/2011	Winter Storm	3/28/2015	High Wind – 64 kts	10/8/2019	Winter Storm
4/18/2011	Winter Storm	11/2/2015	Winter Storm	10/9/2019	Winter Storm
5/19/2011	Winter Storm	11/17/2015	High Wind – 65 kts	10/26/2019	Winter Storm
11/17/2011	High Wind – 66 kts	11/18/2015	High Wind – 60 kts	11/5/2019	Winter Weather
11/23/2011	High Wind – 65 kts	12/9/2015	High Wind – 67 kts	11/18/2019	High Wind – 50 kts
11/27/2011	High Wind – 66 kts	12/14/2015	Winter Storm	11/24/2019	High Wind – 54 kts
12/21/2011	Winter Storm	12/19/2015	Avalanche	11/29/2019	Winter Storm
12/29/2011	High Wind – 58 kts	2/1/2016	Winter Weather	12/31/2019	High Wind – 52 kts
12/30/2011	Winter Storm	2/18/2016	High Wind – 51 kts	1/2/2020	High Wind – 50 kts
1/14/2012	High Wind – 66 kts	3/28/2016	Winter Storm	1/4/2020	High Wind – 50 kts
1/17/2012	Winter Storm	4/4/2016	High Wind – 52 kts	1/31/2020	High Wind – 51 kts
1/18/2012	Winter Storm	4/5/2016	High Wind – 54 kts	2/1/2020	High Wind – 61 kts
1/24/2012	High Wind – 74 kts	10/10/2016	Heavy Snow	2/2/2020	Winter Storm
1/25/2012	High Wind – 74 kts	11/16/2016	Winter Storm	2/6/2020	Winter Storm
1/29/2012	High Wind – 55 kts	12/4/2016	Winter Storm	2/23/2020	High Wind – 55 kts
2/22/2012	High Wind – 64 kts	12/9/2016	Winter Storm	3/3/2020	High Wind – 57 kts
3/3/2012	High Wind – 56 kts	12/11/2016	Avalanche	3/14/2020	Winter Storm
3/18/2012	Winter Storm	12/14/2016	Winter Storm	3/30/2020	Winter Storm
3/20/2012	High Wind – 65kts	12/15/2016	Winter Storm	4/10/2020	Winter Storm
4/5/2012	Winter Storm	12/17/2016	Blizzard	4/11/2020	Winter Storm
11/8/2012	Winter Storm	12/19/2016	High Wind – 52 kts	4/14/2020	Winter Storm
11/9/2012	Winter Storm	12/20/2016	High Wind – 51 kts	9/7/2020	Winter Storm
12/2/2012	High Wind – 66 kts	12/27/2016	High Wind – 69 kts	10/17/2020	Winter Storm
1/10/2013	Winter Storm	12/30/2016	Winter Storm	10/21/2020	Winter Storm
1/27/2013	Winter Weather	1/8/2017	Winter Storm	10/23/2020	Winter Storm
2/9/2013	Winter Storm	1/30/2017	Winter Storm	11/7/2020	Winter Storm
4/21/2013	Winter Storm	1/31/2017	Winter Storm	11/13/2020	High Wind – 92 kts
10/2/2013	Heavy Snow	2/1/2017	Winter Storm	12/20/2020	High Wind – 87 kts
10/3/2013	Heavy Snow	2/9/2017	High Wind – 58 kts	1/12/2021	High Wind – 77 kts
10/13/2013	Winter Storm	2/22/2017	Winter Storm	1/13/2020	Winter Storm
10/27/2013	Winter Storm	3/7/2017	Winter Storm	2/4/2021	Winter Storm
11/8/2013	High Wind – 54kts	3/8/2017	Winter Storm	2/21/2021	High Wind – 50 kts.
12/1/2013	Winter Storm	4/27/2017	Winter Storm	2/22/2021	High Wind – 50 kts.
12/2/2013	Winter Storm	5/17/2017	Winter Storm	3/19/2021	Winter Storm
12/10/2013	Blizzard	9/14/2017	Winter Storm	3/28/2021	High Wind – 54 kts.
12/15/2013	High Wind – 52 kts	9/20/2017	Winter Storm	3/29/2021	High Wind – 55 kts.
1/3/2014	High Wind – 65 kts	9/21/2017	Winter Storm	4/18/2021	Winter Storm

Source: NCDC, 2021. Notes: kts. = knots

Highway accidents occur for a number of reasons including winter weather. Black ice and blowing snow can create dangerous driving conditions. Statistics on winter weather-related highway accidents in Stillwater County over the past 10 years are presented in **Table 4.4-4**.

Table 4.4-4. Stillwater County Vehicular Crashes due to Winter Weather

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	TOTAL
Winter Crashes (Nov, Dec, Jan, Feb)											
Fatal Crash	0	1	1	0	2	0	0	0	1	0	**5**

Table 4.4-4. Stillwater County Vehicular Crashes due to Winter Weather

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	TOTAL
Serious Injury Crash	3	1	5	5	13	3	5	3	0	1	**39**
Total # of Crashes	*160*	*193*	*130*	*139*	*198*	*168*	*190*	*156*	*225*	*182*	***1,741***

Source: MDT, 2021 (http://www.mdt.mt.gov/publications/datastats/crashdata.shtml)

There is no history of a mass casualty accident in Stillwater County involving a school bus; however, school events use bus transportation during winter months when severe weather can pose an extreme risk.

Vulnerability and Area of Impact

Based on review of historic weather data, all of Stillwater County has been classified with a uniform risk for severe winter weather. Structures, utilities, and vehicles are most at risk from the wind component of these storms, while fatalities and injuries can result from exposure.

Snow storms and bitterly cold temperatures are common occurrences in Stillwater County and generally do not cause any problems as residents are used to winter weather and are prepared for it. Sometimes, however, blizzards can occur and overwhelm the ability to keep roads passable. Residents can get isolated and need to be plowed out. Law enforcement has had to get to homes of special needs individuals to deliver medication when severe winter weather has impacted the area. Highway accidents due to poor road conditions can result in mass casualties. MHMP Planning Team members indicated that severe winter weather can impact the Stillwater Mine because when the highway is closed and/or roads are impassible, the mine's labor force can't make it to work.

Severe weather can also affect agriculture in the county. Unseasonable cold and heavy snow can interrupt calving season and result in livestock losses.

Heavy snow and high winds can damage trees in urban areas which have been landscaped with deciduous trees. Broken branches can fall into vehicles and damage roofs.

The greatest threat to the population is the potential for utility failure when high winds, heavy snow or ice bring down power lines. Although cold temperatures and snow are normal in the county, handling the extremes can go beyond the capabilities of the community. Should the temperatures drop below -15 for over 30 days or several feet of snow fall in a short period oftime, the magnitude of frozen water pipes and sewer lines or impassable streets could result in disastrous conditions for many people. If power lines were to fail due to snow/ice load, winds, or any other complicating factor, the situation would be compounded. In the event power or other utilities were disrupted, many homes could be without heat. With temperatures frequently dropping below zero in a typical winter, an event where heating systems failed could send many residents to shelters for protection. Other residents may try to heat their homes through alternative measures and increase the chance for structure fires or carbon monoxide poisoning. Telephone and internet services are most critical for 9-1-1 communications, and the rapid dispatch of needed emergency services. Any of these disruptions can be handled in a short time frame but are quickly problematic in long-term situations. Failure of telephone and internet services would cause dispatch to go down.

There are major issues when blowing snow forces closure of Interstate 90. There is no place for trucks who exit the interstate to park and road closures have backed up traffic for 10 miles. The county wants to explore a policy to close the interstate highway when conditions warrant and provide a parking plan for semi-trucks and people who become stranded.

Probability and Magnitude

Snow generally does not cause Stillwater County communities to shut down or disrupt activities. Occasionally though, extreme winter weather conditions can cause problems. The most common incident in these conditions are motor vehicle accidents due to poor road conditions. Such incidents normally involve passenger vehicles; however, an incident involving a commercial vehicle transporting hazardous materials or a vulnerable population such as a school bus is also possible. **Table 4.4-5** presents severe winter weather events with reported damages from the SHELDUS and NCDC databases.

Table 4.4-5 Stillwater County Severe Winter Weather Events with Damages

Date	Injuries	Fatalities	Property Damage	Crop Damage	Remarks
2/1961	0	0	$937	$937	Wind
3/1961	0.04	0	$1,835	$0	Wind
11/1962	0.07	0	$7,652	$0	Wind
5/1964	0	0.02	$7,868	$0	Winter Weather
12/1964	0	0	$37,271	$0	Winter Weather/Wind
1/1967	0	0	$9,110	$0	Wind
1/1969	0	0	$630	$0	Winter Weather
10/1971	0	0	$11,615	$11,615	Winter Weather
1/1972	0	0	$5,528	$0	Wind
4/1973	0	0	$61,804	$0	Winter Weather
1/1974	0	0	$10,114	$0	Wind
4/1975	0	0	$51,006	$0	Winter Weather
10/1980	0	0	$7,993	$0	Winter Weather
9/1982	0	0	$7,583	$7,583	Winter Weather
9/1983	0	0	$3,480	$348	Winter Weather
12/1987	0	0	$682	$0	Wind
1/1988	0	0	$856	$0	Winter Weather
12/1988	0	0	$159,075	$1,591	Wind
1/1989	0	0	$7,739	$0	Wind
1/1989	0	0	$7,587	$0	Winter Weather
2/1989	0	0	$186,357	$186	Winter Weather
4/1989	0	0	$272	$0	Winter Weather
10/1989	0	0	$7,082	$0	Winter Weather
11/1989	0	0	$759	$0	Wind
12/1989	0	0	$1,517	$0	Winter Weather
1/1990	0	0	$2,879	$0	Wind
3/1990	0	0	$233	$0	Winter Weather
4/1990	0	0	$3,149	$0	Winter Weather
11/1990	0	0	$33,536	$0	Wind
3/1991	0	0	$420	$0	Winter Weather
4/1991	0	0	$11,733	$0	Winter Weather
11/1991	0	0	$1,382	$0	Wind
11/1991	0	0	$1,295	$0	Winter Weather
12/1991	0	0	$6,908	$0	Winter Weather/Wind
8/1992	0	0	$0	$2,988	Winter Weather
10/1992	0	0	$408	$0	Winter Weather
12/1992	0	0	$1,717	$0	Winter Weather
4/1993	0	0	$570	$0	Winter Weather
11/1993	0	0	$434	$4,341	Wind
2/1994	0	0	$15,593	$0	Winter Weather
4/1994	0	0	$555	$0	Winter Weather
1/1995	0	0	$270	$0	Winter Weather
12/1998	0	0	$10,000	$0	Wind
7/2000	0	0	$30,596	$0	Wind

Table 4.4-5 Stillwater County Severe Winter Weather Events with Damages

Date	Injuries	Fatalities	Property Damage	Crop Damage	Remarks
9/2000	0	0	$2,142	$0	Winter Weather
TOTAL	**0.11**	**0.02**	**$720,172**	**$29,589**	

Source: SHELDUS, 2017 (adjusted to 2020 dollars), NCDC, 2021. Note: Often casualties and damage information are listed without sufficient spatial reference. In order to assign the damage amount to a specific county, the fatalities, injuries and dollar losses were divided by the number of counties affected from this event.

Sheltering of community members could present significant logistical problems when maintained over a period of more than a day. Transportation, communication, energy (electric, natural gas, and vehicle fuels), shelter supplies, medical care, food availability and preparation, and sanitation issues all become exceedingly difficult to manage in extreme weather conditions. The American Red Cross has a presence in Stillwater County and has the capacity to provide care for the duration of a severe weather event if needed through pre-determined sheltering agreements.

Annual loss was computed for the severe winter weather hazard in Stillwater County using SHELDUS data and the formula: Frequency x Magnitude x Exposure = Annual Loss, as further explained in *Section 4.1.6*. **Table 4.4-6** presents the results of these calculations.

Table 4.4-6. Stillwater County Severe Winter Weather Annual Loss

No. of Events	Period of Record (Yrs)	Frequency	Property Damage	Magnitude	Exposure	Annual Loss
180	10	18.0	$720,172	0.003277%	$1,220,878,170	$72,017

Severe winter weather occurs in Stillwater County multiple times each year. Therefore, the probability of a severe storm in either the winter or summer is rated as "highly likely".

Future Development

The State of Montana has adopted the 2012 International Building Codes (IBC) which include a provision that buildings must be constructed to withstand a wind load of 75 mph constant velocity and three second gusts of 90 mph and must be designed to withstand a snow load of 30 pounds per square foot minimum. The IBC does not cover single-family residences.

The State of Montana has adopted the 2012 International Residential Code (IRC) for one and two-family residences and townhouses. Local jurisdictions (cities, counties) can elect to become certified to take on enforcement of single-family residences. Stillwater County and the City of Columbus are not certified to enforce building codes and therefore, have no enforcement capabilities to ensure state building codes are followed.

Unexpected Weather Event

The frequency of severe weather events has increased steadily over the last century. The number of weather-related disasters during the 1990s was four times that of the 1950s, and cost 14 times as much in economic losses. Historical data shows that the probability for severe weather events increases in a warmer climate. There has been a sizable upward trend in the number of storms causing large financial and other losses.

Changing extremes in precipitation are projected across all seasons, including higher likelihoods of both increasing snow events. Winter and spring precipitation is projected to increase in the northern states of the Great Plains, relative to the 1971-2000 average. Winter storms have increased in frequency and intensity since the 1950s, and their tracks have shifted northward over the U.S.

Population exposure and vulnerability to severe winter weather is likely to increase as a result of Unexpected Weather Event. Severe weather events may occur more frequently which would lead to increased exposure and vulnerability. Although all people may be affected by the health-related impacts of Unexpected Weather Event, the elderly, young children, and people with weakened immune systems are often the most susceptible.

Property exposure and vulnerability may increase as a result of increased severe winter weather resulting from Unexpected Weather Event. Increased structure damage from high winds, hail and snow load could result as well as damage to crops and landscaping.

Critical facility exposure and vulnerability are unlikely to increase as a result of Unexpected Weather Event impacts associated with severe winter weather; however, critical facility owners and operators may experience more frequent disruption to the services they provide.

4.5 Flooding and Dam Failure

CPRI SCORES:
FLOODING = 3.15
DAM FAILURE = 2.90

Description and History

A flood is a natural event for rivers and streams. Excess water from snowmelt and rainfall accumulates and overflows onto the banks and adjacent floodplains. Floodplains are lowlands, adjacent to rivers and lakes that are subject to recurring floods. A flash flood generally results from a torrential (short duration) rain or cloudburst on a relatively small drainage area. Ice jam flooding occurs when pieces of floating ice carried by the rivers current accumulate at an obstruction to the river. The water held back can cause flooding upstream, and if the obstruction suddenly breaks, flash flooding can then occur downstream as well. Dam failure can also cause flooding.

The National Weather Service provides short-term forecasts and warnings of hazardous weather to the public by producing regularly scheduled severe weather outlooks and updates on various forms of hazardous weather including heavy rain and flooding. A "watch" is issued when conditions are favorable for severe weather in or near the watch area. A "warning" is issued when the severe weather event is imminent or occurring in the warned area. Warning and Advisory Criteria for flooding is presented in **Table 4.5-1.**

Table 4.5-1. Warning and Advisory Criteria for Flooding

Flooding	Warning Description
Flash Flood Watch	Issued when conditions are favorable for flash flooding. It does not mean that flash flooding will occur, but it is possible
Flash Flood Warning	Flash flooding is imminent, water levels rise rapidly with inundation occurring in less than 6 hours.
Flood Watch	Issues when conditions are favorable for flooding. It does not mean flooding will occur, but it is possible.
Flood Warning	Flooding is expected to occur more than 6 hours after the causative event.

Source: National Weather Service, 2021.

Most of the Stillwater County is in the Yellowstone River Basin. The Yellowstone River flows easterly through the center of the county. Its main tributaries from the north are White Beaver Creek, Keyser Creek, Berry Creek and Valley Creek.The main tributaries flowing from the south are Countryman Creek and the Stillwater River with all of its tributaries. Stream flow volumes on the Yellowstone River differ greatly within the area. Peak flow usually occurs May to July. Average flows of 3,757 cubic feet per second (cfs) have been recorded up river at Livingston and 6,913 cfs down river at Billings.

The Stillwater River drains over 900 square miles. Flows range from 600 cfs in the winter to 4900 cfs during peak flow May to July. An average flow of 991 cfs has been recorded at the gage station between Columbus and Absarokee. Tributaries to the Stillwater River include Shane Creek, Joe Hill Creek, Whitebird Creek, Beaver Creek, Rosebud Creek, Jack Stone Creek, Spring Creek, Grove Creek, Trout Creek, Bad Canyon Creek, Midnight Canyon Creek, Little Rocky Creek, Castle Creek, Lodgepole Creek, Prairie Creek, Nye Creek, Woodbine Creek and numerous other smallertributaries.

Rosebud Creek drains about 400 square miles. Flows range from 200 cfs in the winter to 1400 cfs during peak flow May to July. An average flow of 438 cfs has been recorded at the gage station above Absarokee. Tributaries to Rosebud Creek include Butcher Creek, East Rosebud Creek, Antelope Creek, West Rosebud Creek, Fiddler Creek and Fishtail Creek.

A relatively small portion of northern Stillwater County drains into the Musselshell River Basin from Big Coulee Creek and Painted Robe Creek.

Heavy spring rains in conjunction with snowmelt runoff have caused major floods in Stillwater County. The headwaters of most streams lie at high altitudes and these areas can accumulate heavy winter snowpack. Streamflows are typically at their lowest during the winter and increase steadily during the spring as warmer temperatures, sometimes augmented by rainfall, begin to melt the snowpack. Major floods are usually preceded by a warm, moist winter which produces a heavy snowpack and lingers late into the spring. The floods are then triggered by a major Pacific storm which brings warm temperatures and heavy rain. Ice jams also occur at random sites with no predictable pattern during winter and early spring (FEMA, 2015). Extensive flash flooding from rapid snow melt in 2014 caused damage county-wide. Some years, ice jamming is problematic.

Stillwater County received Presidential Disaster Declarations due to flooding in 1978 (DR-558-MT), 1997 (DR-1183-MT), 2011 (DR-1996-MT), 2014 (DR-4172-MT), and 2019 (DR-4437-MT). A state emergency declaration for flooding was authorized in 1996 (EO-12-96; MT-4-96). A summary of flooding in Stillwater County is presented in **Table 4.5-2.**

Table 4.5-2. Stillwater County Flood Reports

Date	Location	Comment
1/1/1997	Columbus	An ice jam break 2 miles southwest of Columbus on the Stillwater River flooded a ranch. The flood stranded two people who had to be rescued by emergency personnel.
1/8/1997	Columbus	An ice jam broke loose causing waters to rise 3 to 4 feet quickly on the Yellowstone River 3 miles southeast of the city of Columbus. A house was damaged as well as some farm equipment.
5/21/1997	Reed Pt	Small stream flooding into low lying areas west of Ryegate
6/1/1997	Stillwater Co.	Record flooding occurred during the month of July across southeast and southcentral Montana during June. Record snowpack, heavy rains and unusually warm temperatures were the reasons for the flooding.
6/8/1997	Stillwater	Water covering streets in downtown area of Park City.
5/11/2005	Stillwater Co.	Road damaged by flooding on Old Boulder Road; West Fork of the Stillwater River flooded parts of Stillwater River Road west of Beehive; Highway 78 was under a foot of water in places between Absarokee and Red Lodge.
5/20/2011	Rapelje	Significant flooding occurred all across Stillwater County, including streams and creeks emerging from the Beartooth Foothills. This resulted in numerous road closures and significant damage in spots to rural roads. Specifically, Whitebird, Benbow, and the Stillwater River roads were closed. During the height of the flooding, a couple of families were stranded by the flood waters. A bridge was washed out on Whitebird Creek. Subsequent flooding on the Stillwater River was observed the May 24-25th.
5/23/2011	Columbus	Extreme flooding reported on Keiser Creek, north of Columbus. A dramatic rise in water levels occurred in the region, estimated 6-7 foot rise in a matter of minutes. Local bridge washed out along with damage to a shop. Flooding worsened as a result of debris collection at a bridge. Several houses flooded in the area.
6/6/2011	Columbus	A thunderstorm producing 0.63 inches of rain in 20 minutes resulted in water over some roads just northwest of Columbus.
3/6/2014	Rapelje	County officials and the MT Dept. of Transportation reported that small stream and low land flooding occurred across the area. Water also flowed across some of the roads along the Beartooth Foothills south of Reed Point and Columbus.
3/9/2014	Absarokee	County officials reported that some streams and creeks were running high, and in some areas, water was running over roadways and flooding fields. Some roads became impassable.
5/23/2018	Absarokee	Very heavy thunderstorms produced 2 to 4 inches of rain in a short period of time across the area. There were numerous reports of water flowing down and across roads, as well as a mud slide along portions of the Stillwater River Road between Columbus and Absarokee.

Table 4.5-2. Stillwater County Flood Reports

Date	Location	Comment
3/23/2019	Absarokee	Many roads along the foothills were washed out or severely damaged due to rain and snowmelt on top of ground that remained frozen. Approximately 12 roads were damaged, 9 of which had to be closed. The county applied for a disaster declaration due to the extent of the damage. Damage amounts totaled $804,387.
5/26/2019	Rapelje	Sixshooter Creek in Rapelje flooded up to a foot deep and 200 yards wide over Hwy 306.

Source: NCDC, 2021.

Dam Failure

Dams have been placed around Montana for many reasons including recreation, flood control, irrigation, water supply, hydroelectricity, and mining. Dams are built and owned by a variety of entities such as private individuals, utilities, and the government. Dams come in all shapes and sizes from small earthen dams to large concrete structures. The structural integrity of a dam depends on its design, maintenance, and weather/drainage situation. Problems arise when a dam fails and people and/or property lie in its inundation area. Dams can fail for a variety of reasons including seismic activity, poor maintenance, overwhelming weather and flow conditions, or by an intentional act. Dam failure can be compared to riverine or flash flooding in the area downstream from the dam, and sometimes for long distances from the dam, depending on the amount of water retained and the drainage area. Other dams may be located in areas that result in little if any damages during a failure.

A tailings dam is typically an earth-fill embankment dam used to store byproducts of mining operations after separating the ore from the gangue. Tailings can be liquid, solid, or a slurry of fine particles, and are usually highly toxic and potentially radioactive. Unlike water retention dams, the height of a tailings dam is typically increased (raised) throughout the life of the mine. According to Sibanye-Stillwater Mining Company personnel, the tailings at their Stillwater Mine are a mixture of water and suspended soils that would flow if there was a breach in the dam.

The U.S. Army Corps of Engineers, National Inventory of Dams website keeps a record of dams across the country. Hazard ratings are given to those dams for emergency management planning purposes. These ratings, high, significant, and low, are based on the potential for loss of life and property damage from the failure of the dam, not the condition or probability of the dam failing, as described in **Table 4.5-3**. Stillwater County DES keeps copies of Emergency Action Plans (EAPs) for the high hazard dams that could impact the county.

Table 4.5-3. Hazard Ratings for Dams

Rating	Description
Low Hazard Potential	Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.
Significant Hazard Potential	Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.
High Hazard Potential	Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

Source: FEMA, 2004.

There are three high hazards dam in Stillwater County; Mystic Lake Dam and two tailings dams (Hertzler and Nye) associated with the Stillwater Mine. **Table 4.5-4** presents details on these dams, as available. There is no record of failure of a high hazard dam impacting Stillwater County and there are no dams in adjoining counties with the potential to impact Stillwater County. Stillwater County DES maintains copies of Emergency Action Plans (EAPs) for these dams.

Details on the Stillwater Mine's Hertzler and Nye tailings dams were not available from the mining company or MDEQ. MDEQ indicated, however, that the Sibanye-Stillwater Mining Company is applying to get a new tailings dam permitted and that it will be needed in approximately four years when the Hertzler tailings dam reaches its permitted height. Currently, the Nye tailings pond is being capped with a four-foot soil geotextile (C. Freshman, personal communication, July 26, 2021).

Table 4.5-4. High Hazard Dams in Stillwater County

Dam Name	Drainage	Height (feet)	Length (feet)	Maximum Storage (acre-ft)	Dam Type/ Purpose	Year Completed	Owner
Mystic Lake	W. Rosebud Creek	45	368	47,000	Concrete/ Hydroelectric	1920s	NorthWestern Energy
Stillwater Hertzler Tailings Dam	Stillwater River	178	8,600	9,917	Tailings	2000	Sibanye-Stillwater Mining Co.
Stillwater Nye Tailings Dam	Stillwater River	121	4,900	2,535	Tailings	1986	Sibanye-Stillwater Mining Co

Source: DNRC, 2021b.

Vulnerability and Area of Impact

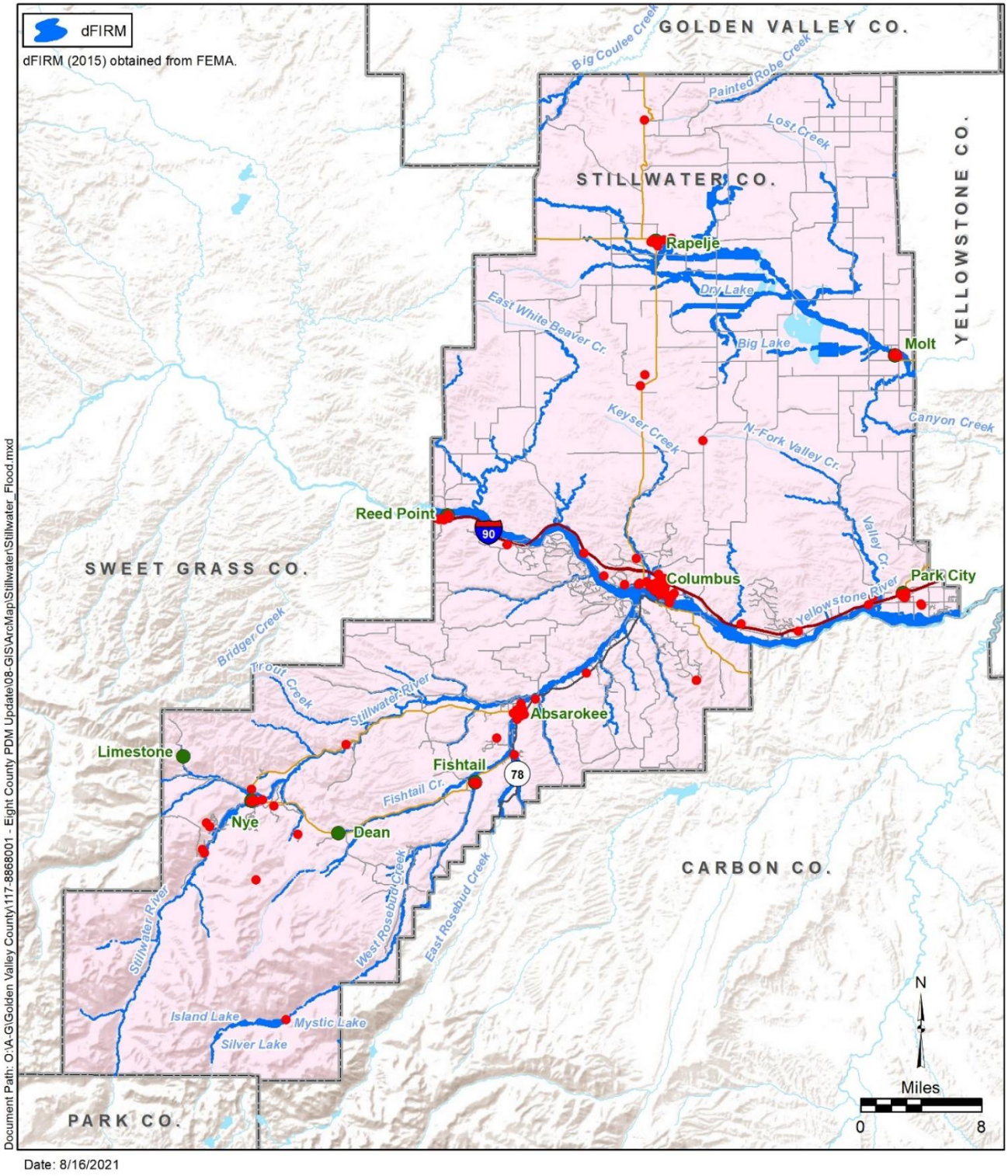
According to the Stillwater County Flood Insurance Study (FEMA, 2015), the majority of the flood damage which has occurred in Stillwater County has been caused by encroachment on the flood plain by residential construction, farm buildings and fences, irrigation diversions, dikes, and roads. Many recreational and year-round homes are located on the river flood plain. Some of these homes are inundated by common high water events, while others are well above the 1.0-percent-annual-chance floodplain.

The U.S. Geological Survey (USGS) maintains a stream gaging station on Stillwater River near Absarokee. Major floods were recorded at this site in 1967, 1974, and 1975. The recurrence intervals for the floods were 70 years (12,000 cfs), 50 years (11,600 cfs), and 45 years (11,300 cfs), respectively. The majority of the tributaries to Stillwater River do not have gaging sites, but probably experienced floods of a similar recurrence interval during the high-water years of 1967, 1974, and 1975. These floods caused widespread damage to residences, farm buildings, bridges, and summer homes throughout Stillwater County (FEMA, 2015).

According to the MHMP Planning Team, the Yellowstone River has changed quite a bit in the last several years. The City of Columbus is concerned about the intake at one of their water supply sources on the Island near old shop facility.

There is an increased risk of flooding during heavy rains after wildfire because the burned ground is unable to absorb the falling rain, producing runoff conditions much like a parking lot. Because of this, even modest rainstorms over a burned area can result in flash flooding downstream. These floods are typically much larger for a given sized storm than they were before the wildfire, so flooding is likely to be much more extensive following wildfire, endangering properties previously considered safe from flooding. These floodwaters typically transport surface debris such as down trees, boulders, and gravel.

Figures 6 through 6B present the flood hazard impact area developed for the MHMP for Stillwater County, Columbus, and Absarokee, respectively. These maps are from digital flood insurance rate maps (DFIRMs).



Legend

- Critical Facility
- Town
- Interstate
- Primary Road
- Secondary Road
- City-County Road
- Stream
- Lake
- County Boundary

Figure 6
Flood Hazard Area
Stillwater County, Montana
Multi-Hazard Mitigation Plan

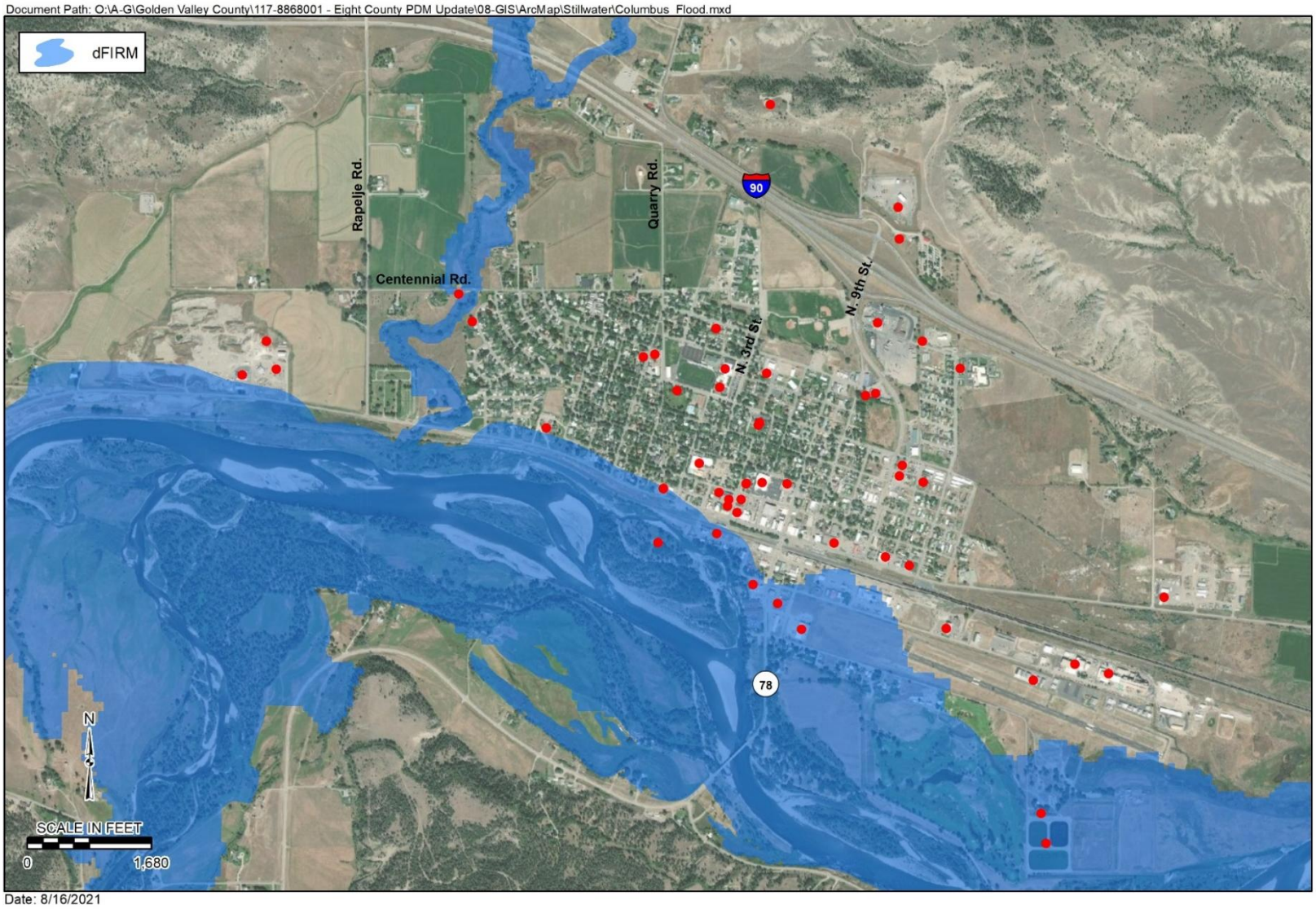


Figure 6A
Flood Hazard Area - Columbus
Stillwater County, Montana
Multi-Hazard Mitigation Plan

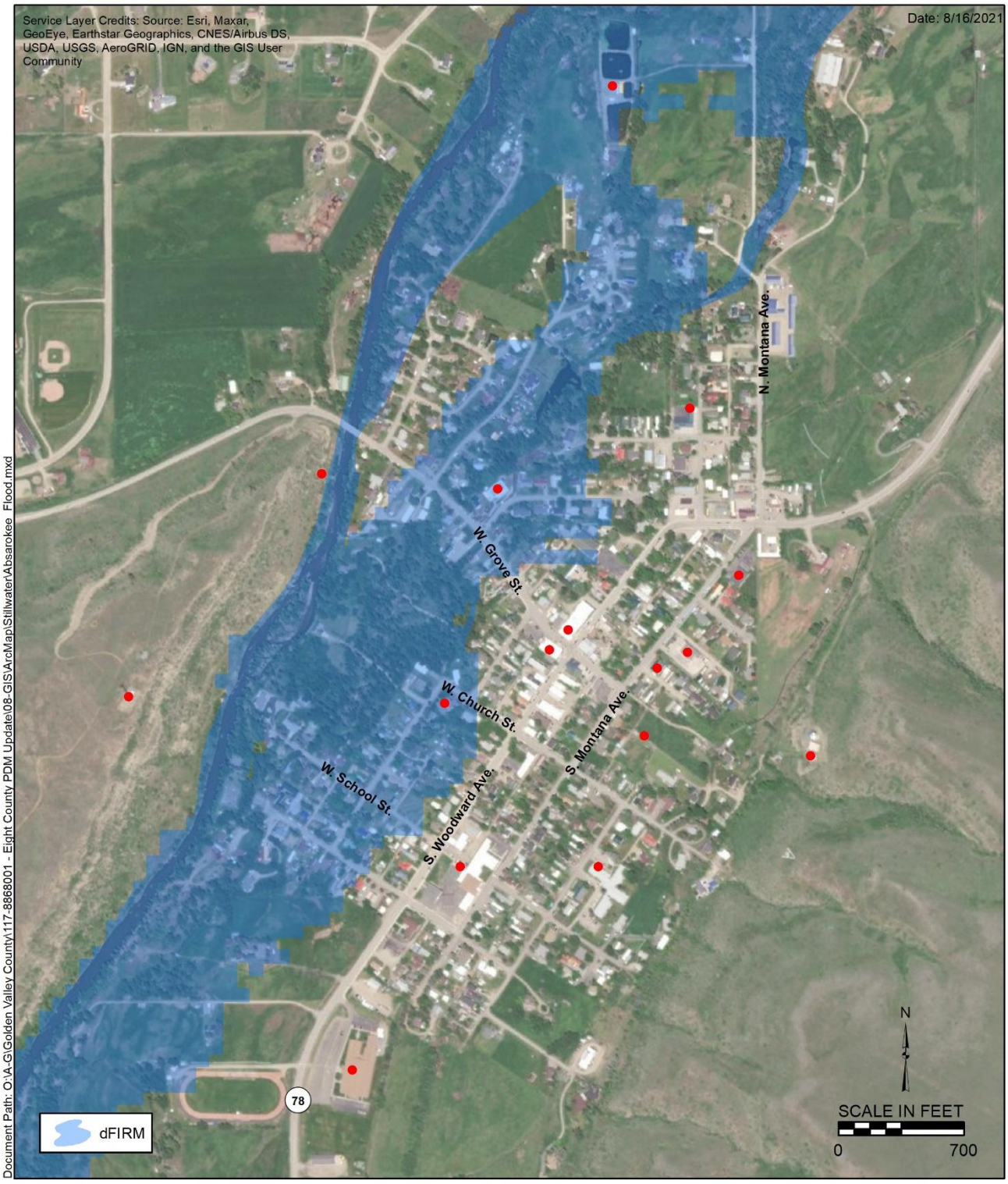


Figure 6B
Flood Hazard Area - Absarokee
Stillwater County, Montana
Multi-Hazard Mitigation Plan

Legend

- Critical Facility

Figures 7 through 7B show the dam failure hazard impact areas used for the MHMP analysis for Stillwater County, Columbus, and Fishtail, respectively. These consist of the inundation areas for the high hazard dams, available from EAPs and the Sibanye-Stillwater Mining Company. Areas directly downstream from high hazard dams would be most at risk for loss of life and structural damage from dam failure. Dam failures can potentially cause massive flooding and losses.

Flood Protection Measures

Flood protection measures in Stillwater County are limited and include no major structures. Large riprap lines the east bank of Rosebud Creek through Absarokee, providing bank stabilization in an area where high stream velocities occur (FEMA, 2015).

Floodplain and Floodway Management

Many of the flood prone areas in Stillwater County are covered by Flood Insurance Rate Maps (FIRMs), developed by FEMA. These maps show areas of 100-year Special Flood Hazard Areas, commonly referred to as 100-year floodplains in the County. FEMA DFIRMs for Stillwater County in 2014. One correction to the new DFIRMS is the area by Granite Peak Park in Columbus that is no longer a flood prone area. A letter of map revision (LOMR) from FEMA has been issued regarding this area. The map won't be changed at this time but will be when changes warrant physical revision or republication.

The National Flood Insurance Program (NFIP) encourages local governments to adopt "sound" floodplain management programs to reduce private and public property losses due to floods. Stillwater County and the City of Columbus participate in the NFIP. **Table 4.5-5** presents statistics on flood insurance policies and losses.

Table 4.5-5. National Flood Insurance Program Statistics (through 2/28/2021)

Jurisdictions	Policies in Force	Insurance in Force	Number of Losses	Total Payments
Stillwater County	69	$17,851,900	0	-
Columbus, city	2	$490,000	20	$74,161

Source: FEMA, 2021a. https://nfipservices.floodsmart.gov//reports-flood-insurance-data

A repetitive loss property is any insurable building for which two or more claims of more than $1,000 were paid by the NFIP within any rolling 10-year period, since 1978. There are no repetitive loss properties in Stillwater County or Columbus. Severe repetitive loss properties have had at least four NFIP claim payments over $5,000 each and the cumulative amount exceeding $20,000; or, where at least two separate claim payments have been made with the cumulative amount exceeding the market value of the building. No severe repetitive loss properties exist in the county or Columbus.

The NFIP's Community Rating System (CRS) recognizes community efforts (beyond minimum standards) by reducing flood insurance premiums for the community's property owners. CRS discounts on flood insurance premiums range from 5 percent up to 45 percent. Those discounts provide an incentive for new flood protection activities that can help save lives and property in the event of a flood. To participate in the CRS, a community can choose to undertake some of the 18-public information and floodplain management activities. Based on the total number of points a community earns, the CRS assigns you to one of 10 classes. Your discount on flood insurance premiums is based on your class. Neither Stillwater County nor Columbus participates in the CRS program.

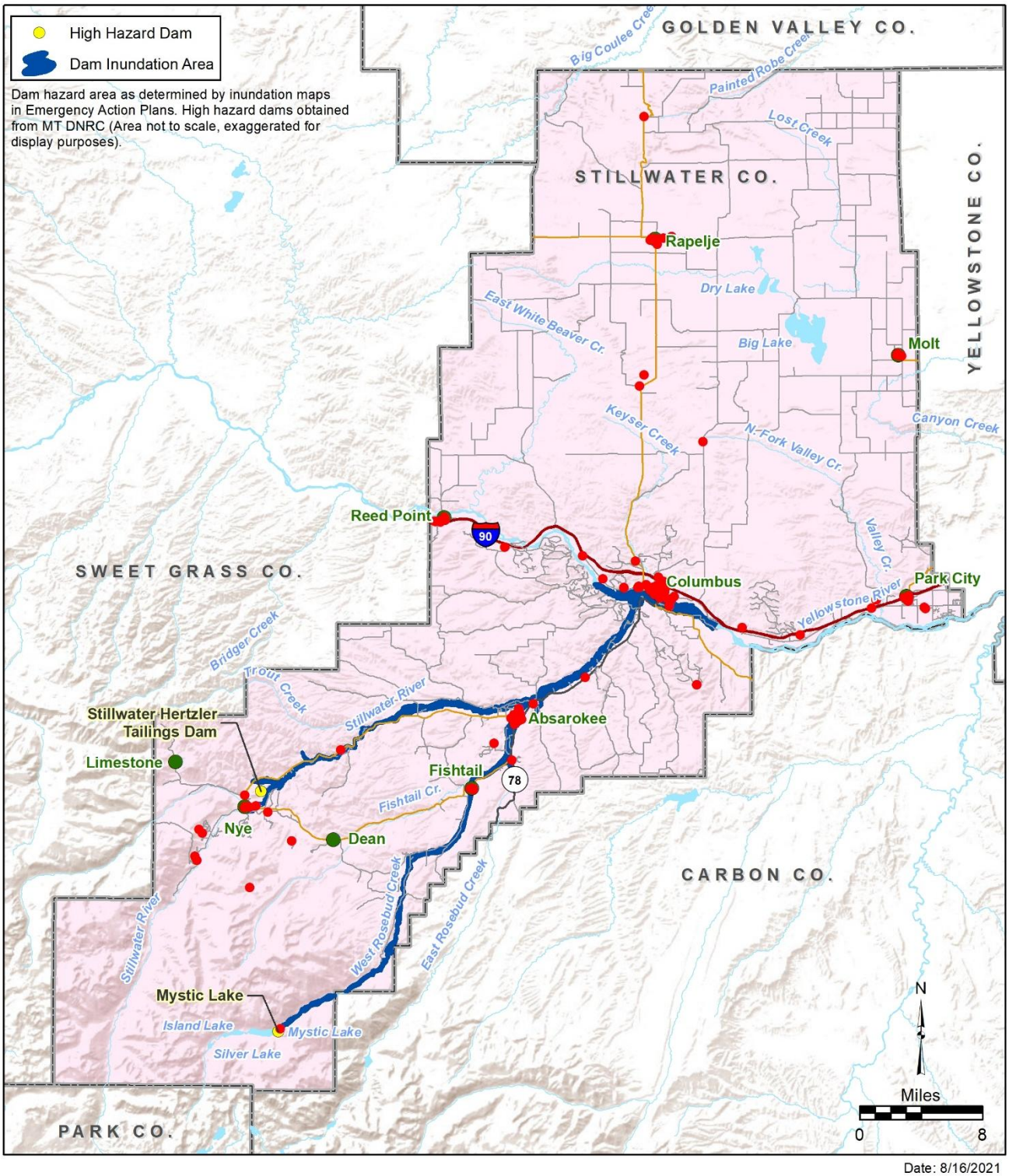


Figure 7
Dam Failure
Stillwater County, Montana
Multi-Hazard Mitigation Plan

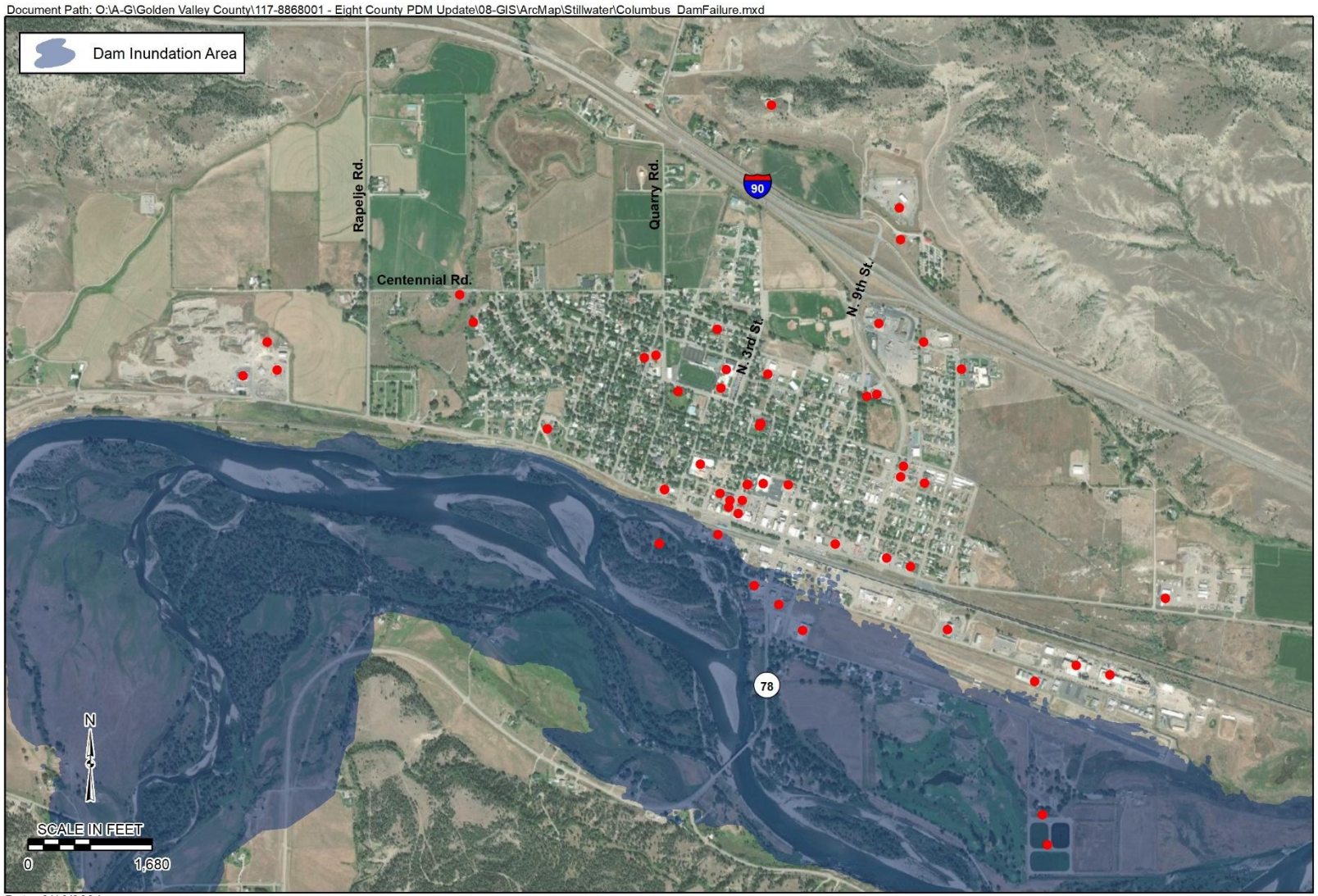


Figure 7A
Dam Failure Hazard Area - Columbus
Stillwater County, Montana
Multi-Hazard Mitigation Plan

Legend

- Critical Facility

Figure 7B
Dam Failure Hazard Area - Fishtail
Stillwater County, Montana
Multi-Hazard Mitigation Plan

Probability and Magnitude

It is estimated that flooding causes 90 percent of all property losses from natural disasters in the United States and kills an average of 150 people a year nationwide. Most injuries and deaths occur when people are swept away by flood currents and most property damage results from inundation by sediment-laden water. Faster moving floodwater can wash buildings off their foundations and sweep vehicles downstream. Pipelines, bridges, and other infrastructure can be damaged when high water combines with flood debris. Basement flooding can cause extensive damage to the structure and systems of a building.

Floods with associated property damage in Stillwater County from the SHELDUS database are presented in **Table 4.5-6**.

Table 4.5-6. Stillwater County Flood Events with Damages

Month/ Year	Injuries	Fatalities	Property Damage	Crop Damage	Month/ Year	Injuries	Fatalities	Property Damage	Crop Damage
3/1969	0	0	$6,297	$0	6/1993	0	0	$1,302	$0
2/1971	0	0	$12,509	$0	3/1994	0	0	$22,789	$22,789
6/1972	0	0	$6,060	$0	2/1995	0	0	$540	$0
5/1991	0	0	$1,451	$0	5/2011	0	0	$2,342,274	$0
6/1991	0	0	$12,020	$967	3/2019	0	0	$804,000	$0
1/1993	0	0	$130	$0	**TOTAL**	**0**	**0**	**$3,209,372**	**$23,756**

Source: SHELDUS, 2017 (adjusted to 2020 dollars), NCDC, 2021.

The flood hazard impact map used for the MHMP analysis, as shown on **Figures 6 through 6C,** was from DFIRM maps available for Stillwater County. The results of the vulnerability analysis are presented in **Table 4.5-7**.

Table 4.5-7. Stillwater County Vulnerability Analysis; Flooding

Category	Stillwater Co. (balance)	Columbus (City)
Residential Property Exposure $	$87,005,658	$5,281,973
# Residences at Risk	414	37
Commercial, Industrial & Agricultural Property Exposure $	$26,572,135	$5,699,927
# Commercial, Industrial & Agricultural Properties at Risk	107	11
Critical Facilities Exposure Risk $	$2,106,893	$5,527,604
# Critical Facilities at Risk	12	8
Bridge Exposure $	$43,817,874	$0
# Bridges at Risk	55	0
Persons at Risk	1,134	83
Persons Under 18 at Risk	237	17
Persons Over 65 at Risk	267	20

The GIS analysis indicates that 41,432 acres in Stillwater County (3.6 percent) are located within the flood hazard area including: 451 residences, 118 commercial, industrial and agricultural buildings, and 20 critical facilities. The *Flood* section in **Appendix C-3** presents the critical facilities and bridges located in the 100-year flood hazard area.

The probability of future flooding in Stillwater County and its jurisdictions is high. The weather patterns in the region suggest a continued propensity toward receiving large amounts of moisture over short periods of time, and rapid snow melt resulting from dramatic temperature changes. With the Yellowstone River and the large number of smaller tributary streams, future flooding events will be inevitable.

Based on the frequency of past events, the probability of flooding in Stillwater County is rated as "likely"; an event that occurs less than once per year but more than once every 10 years. MHMP Planning Team members ranked flooding as "highly likely", an event that occurs more than once each year.

The dam failure hazard impact area is a compilation of inundation area of high hazard dams affecting Stillwater County, as available (**Figures 7 through 7B**). The MHMP analysis used the same methodology as described above under flooding. Results are shown in **Table 4.5-8**.

Table 4.5-8. Stillwater County Vulnerability Analysis; Dam Failure

Category	Stillwater Co. (balance)	Columbus (City)
Residential Property Exposure $	$123,393,808	$3,702,475
# Residences at Risk	693	29
Commercial, Industrial & Agricultural Property Exposure $	$26,172,823	$4,830,190
# Commercial, Industrial & Agricultural Properties at Risk	113	6
Critical Facilities Exposure Risk $	$21,488,541	$4,923,539
# Critical Facilities at Risk	17	6
Bridge Exposure $	$11,931,252	$0
# Bridges at Risk	19	0
Persons at Risk	1,690	65
Persons Under 18 at Risk	353	14
Persons Over 65 at Risk	398	15

The GIS analysis indicates that 11,580 acres in Stillwater County (1.0 percent) are located in the dam inundation hazard area including 722 residences, 119 commercial, industrial and agricultural buildings, and 23 critical facilities. The *Dam Failure* section in **Appendix C-3** presents supporting documentation from the risk assessment including the critical facilities and bridges located in the dam inundation hazard area.

A dam failure event may allow for some advanced warning to the public, and therefore, the potential impact to the population is considered moderate. The probability of failure of a high hazard dam impacting Stillwater County was rated as "unlikely" by the MHMP Planning Team.

Future Development

Stillwater County adopted floodplain development regulations that establish a permitting system for development within the 100-year floodplains of local streams. The regulations provide guidance for development in flood-prone areas by restricting uses that are dangerous to public health, safety and property. Uses are delineated as to which uses are permitted, permitted conditionally or prohibited, as outlined in the current floodplain regulations. According to the MHMP Planning Team, since 2020 when the COVID-19 pandemic forced people to work at home, many people have moved to Stillwater County and there has been more development in the floodplain.

Stillwater County and the City of Columbus prohibit the development of future properties within flood-prone areas under their subdivision regulations. Building is not allowed within the regulated 100-year floodplain, or areas deemed subject to flooding, or if any portion of a proposed subdivision is within 2,000 horizontal feet and less than 20 vertical feet of a live stream draining an area of 25 square miles or more. Even within existing lots, new development within the 100-year floodplain requires a floodplain permit which generally prohibits new structures unless they can meet flood proofing requirements. In addition, subdivision regulations require flood hazard assessments in areas that may be subject to flooding but are outside regulated floodplains. Floodplain

Hazard Management Regulations, administered by the county and cities, outline conditions where permits are needed for development in the floodway.

The Stillwater County subdivision regulations do not address new construction in dam inundation areas.

Unexpected Weather Event

Many scientists agree that Unexpected Weather Event will increase heavy rainfall and storms across the U.S., which will result in elevated water levels that may lead to a higher frequency of flooding. The Montana Climate Assessment (Whitlock C., et.al., 2017) provides a well-referenced discussion on the effects of Unexpected Weather Event on flooding, as summarized below.

Across Montana, precipitation is projected to increase in winter, spring, and fall. The largest increases are expected to occur during spring in the southern part of the state. Warming will continue to reduce mountain snowpack, and this could reduce flood risk related to rain-on-snow events by reducing the quantity of water available for release stored as snow. Warming is also likely to increase the amount of winter and spring precipitation that falls as rain (particularly in rain-snow transition zones), which will accelerate snowmelt and could increase flood risk, depending on snowpack, soil moisture, and other conditions. As such, rising temperatures alone will influence flood risk, regardless of trends in precipitation; yet the effects will likely be location- and event-specific and therefore, difficult to predict.

Some research suggests that extreme precipitation events can actually intensify more quickly than what is projected by general circulation models. Additionally, flood risk depends on specific storm characteristics that are difficult to capture in most models. Moreover, the particular effects of projected changes in temperature and precipitation on flood risk will depend on location, elevation, and weather conditions, as well as human practices (Whitlock C., et.al, 2017).

Population, property, and critical facility flood exposure may increase as a result of Unexpected Weather Event. Runoff patterns may change resulting in flooding in areas where it has not previously occurred with an increased risk to facilities that have not historically flooded.

The significance of increased flooding is great. Besides impacting communities, destroying homes, and causing deaths, floods can cause drinking water to become contaminated. Floods can also cause hazards such as disease-carrying animals and spills of chemicals or other hazardous materials. Overall, if flooding is to increase from Unexpected Weather Event it will also pose risks to people's health and to entire communities.

Small changes in rainfall, runoff, and snowpack conditions may have significant impacts for water resource systems, including dams. Dams are designed partly based on assumptions about a river's flow behavior, expressed as hydrographs. Changes in weather patterns can have significant effects on the hydrograph used for the design of a dam. If the hygrograph changes, it is conceivable that the dam can lose some or all of its designed margin of safety, also known as freeboard. If freeboard is reduced, dam operators may be forced to release increased volumes earlier in a storm cycle in order to maintain the required margins of safety. Such early releases of increased volumes can increase flood potential downstream.

Dams are constructed with safety features known as "spillways." Spillways are put in place on dams as a safety measure in the event of the reservoir filling too quickly. Spillway overflow events, often referred to as "design failures," result in increased discharges downstream and increased flooding potential. Although Unexpected Weather Event will not increase the probability of catastrophic dam failure, it may increase the probability of design failures.

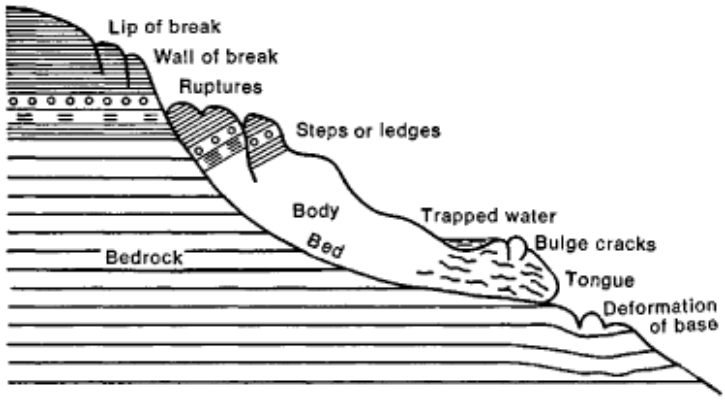
Population and property exposure to the dam failure hazard are not likely to change significantly as a result of Unexpected Weather Event. The potential increase in probability of dam failure would not likely impact additional areas not already identified on inundation maps with the exception of spillway shadows which are not always captured on inundation maps. Dam owners and operators may need to alter maintenance and operations to account for changes in the hydrograph and increased sedimentation.

4.6 Landslide

CPRI SCORE = 3.0

Description and History

A landslide is the movement of a soil and/or rock mass down a slope. Any area composed of very weak or fractured materials resting on a steep slope can and likely will experience landslides. Landslides or debris flows, are often difficult to distinguish from flash floods and possess similar destructive potential and rapid onset. Debris flows generally occur during periods of intense rainfall or rapid snowmelt. They usually start on steep hillsides as shallow slides that liquefy and accelerate. The consistency of debris flow range from watery mud to thick, rocky mud that can carry large items such as boulders, trees and cars. When the flow reaches flatter ground, debris can spread over a broad area, sometimes accumulating in thick deposits. Any given mass movement is triggered by a single event. The two most common triggers are earthquakes and heavy rainfall.



A rock fall refers to quantities of rock falling freely from a cliff face. A rock fall is a fragment of rock (a block) detached by sliding, toppling, or falling, that falls along a vertical or sub-vertical cliff, proceeds down slope by bouncing and flying along ballistic trajectories or by rolling on talus or debris slopes. Favorable geology and climate are the principal causal mechanisms of rock fall, factors that include intact condition of the rock mass, discontinuities within the rock mass, weathering susceptibility, ground and surface water, freeze-thaw, root-wedging, and external stresses.

Slope failure occurs when the gravitational force of slope materials exceed resisting forces due to strength, friction, and cohesion of the supporting materials. Slope properties, such as steepness, layering, fracturing of materials, or lack of vegetation, can make them inherently susceptible to failure. Factors such as moisture, overloading, and undercutting, can make matters worse. These factors can occur naturally or are induced by development activity. Slope failures are distinguished by five types: falls or free drops from steep cliffs; slides or movement of unconsolidated materials along slip surfaces of shear failure; slumps or movements of consolidated materials along the surface of shear failures; flows; and the slow or rapid fluid-like movement of soils and other unconsolidated materials. Very slow down-slope flow of soil is referred as creep. The average flow rate of materials can range from a fraction of an inch to 4 to 5 inches a week. Factors that influence creep include growing vegetation, freezing and thawing, and burrowing animals. Lateral spreads may occur on flat or gently sloping land due to liquefaction of underlying materials.

A landslide event that occurred in Stillwater County is described below.

June 2015 - A rock slide occurred on the Stillwater River Road in Nye on June 3, 2015, closing the road for several weeks due to safety concerns. One home was evacuated, and officials recommended the evacuations of two others. A small team of engineers evaluated the slide and indicated that moisture from heavy rainstorms had seeped behind wedges that were holding large sections of rock together, causing the slide. The rock slide completely blocked the road and came down with enough force to push water and debris from the Stillwater River into the yard of a home on the opposite bank. The slide occurred just upriver from the Midnight Canyon Bridge. Phone service was knocked out in the Midnight Canyon area temporarily. Homeowners were concerned about a large section of rock that remained hanging and wondered whether there was funding to shore up the area. County officials stated that while some options had been discussed, no detailed plans had been made. (Stillwater County News, *Unstable Rockslide to Keep Stillwater River Road Closed*, June 11, 2015).

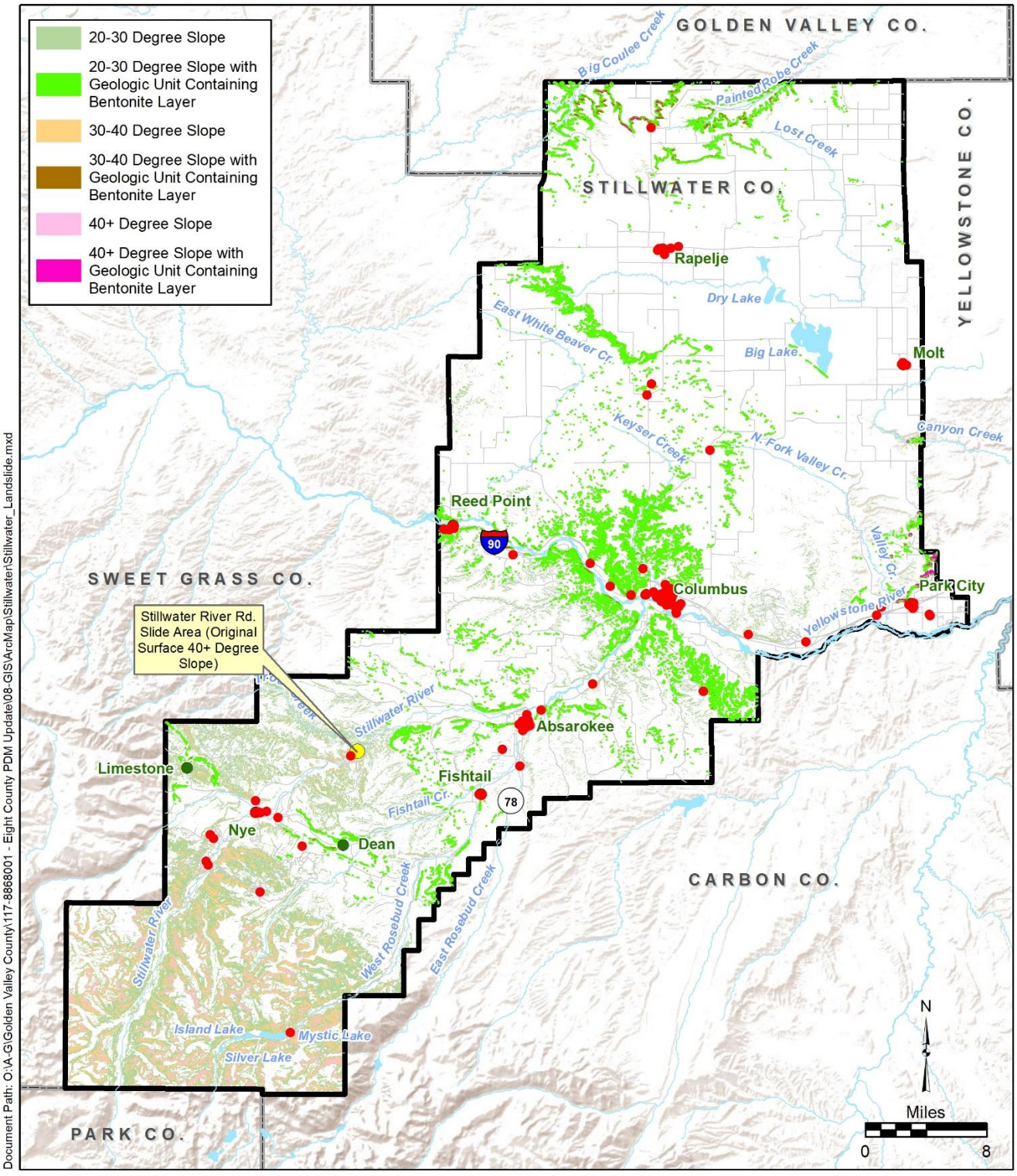
Vulnerability and Area of Impact

In Stillwater County, unstable slopes and landslides are most common in the area south of the Yellowstone River. The underlying Cretaceous sediments in this area consist of thinly bedded shales, some containing beds of bentonite. This material tends to slide along the bedding planes when excavated, particularly if the beds slope into the excavation. Other types of slides and slope instability are caused from excavating into or over wetting unconsolidated material, such as river terraces.

Steep slopes in excess of 25 percent grade are considered to be unsuitable for subdivisions; however, the southern portion of Stillwater County has many steep rocky slopes on public land that can slide and block access. Evidence of past landslides is an important indicator of a high probability of future hazards.

Probability and Magnitude

The landslide hazard impact area used for the MHMP analysis was created using GIS. National Elevation Datasets (NEDs) for Stillwater County were downloaded from the U.S. Geological Survey's (USGS) National Map website (https://www.usgs.gov/core-science-systems/national-geospatial-program/national-map) and geologic datasets were downloaded from the Montana Bureau of Mines and Geology (MBMG) website (https://www.mbmg.mtech.edu/information/gis/gis.asp). NED datasets were processed to display slope in degrees across the county. This dataset was then filtered for slopes that range from 20 to 40+ degrees. Geologic datasets were filtered for formations or lithologies that are particularly prone to movement, including volcanic rocks, or sediments derived from them. These sediments often contain ash and clay materials that facilitate movement. The formations containing bentonite beds and layers within Stillwater County include Bearpaw Shale, Claggett, Fort Union, Hell Creek, Mowry Shale, Mowry/Fall River, Niobrara, Telegraph Creek, Telegraph Creek/Niobrara, and Thermopolis/Fall River. **Figure 8** presents the landslide hazard impact areas in Stillwater County.



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Date: 8/16/2021

Legend

- Critical Facility
- 2015 Stillwater River Rd. Slide Area
- Town
- Road
- Stream
- Lake
- Stillwater County
- County Boundary

Figure 8
Landslide / Rockfall Hazard Area
Stillwater County, Montana
Multi-Hazard Mitigation Plan

The landslide hazard area, including slopes over 20 degrees, was intersected with the critical facility and general building stock database to determine exposure. Population exposure was calculated using U.S. Census county estimates. **Table 4.6-1** presents the results of the landslide vulnerability analysis.

Table 4.6-1. Stillwater County Vulnerability Analysis; Landslide

Category	Stillwater Co. (balance)	Columbus (City)
Residential Property Exposure $	$4,728,632	$0
# Residences at Risk	20	0
Commercial, Industrial & Agricultural Property Exposure $	$1,122,370	$0
# Commercial, Industrial & Agricultural Properties at Risk	3	0
Critical Facilities Exposure Risk $	$0	$0
# Critical Facilities at Risk	0	0
Bridge Exposure $	$620,000	$0
# Bridges at Risk	1	0
Persons at Risk	52	0
Persons Under 18 at Risk	11	0
Persons Over 65 at Risk	12	0

The GIS analysis indicates that there are almost 144,980 acres (12.6 percent) in the landslide hazard impact area in Stillwater County including 20 residences, 3 commercial, industrial, and/or agricultural buildings, and 0 critical facilities. The *Landslide* section in **Appendix C-3** lists the critical facilities and bridges within the landslide hazard impact area.

Based on the frequency of landslide events in Stillwater County, the MHMP Planning Team rated the probability as "highly likely", an event that occurs more than once a year.

Future Development

It is the responsibility of those who wish to develop their property to assess the degree of hazard in their selection of development sites. Although the physical cause of many landslides cannot be removed, geologic investigations, good engineering practices, and effective enforcement of land-use management standards can reduce landslide hazards.

The Stillwater County subdivision regulations state that lands with the potential hazard for rock falls, landslides, unstable soils or steep slopes in excess of 25 percent grade shall not be subdivided for building or residential purposes unless the hazards are eliminated or mitigated. The Stillwater County Growth Policy (2018) states that subdivisions or associated improvements proposed on land with evidence of landslides or slopes greater than 25 percent are considered to have potential adverse effects on the natural environment.

Unexpected Weather Event

Landslides represent a major threat to human life, constructed facilities and infrastructure in most mountainous regions of the world. Considering future climate scenarios and modified precipitation patterns, the landslide activity will most probably change too. More precipitation now falls as rain rather than snow in northern regions and, as a consequence, more landslides are expected to occur. It is expected that shallow slips and debris flows will take place more frequently as a consequence of more extreme weather events.

4.7 Communicable Disease

CPRI SCORES
HUMAN DISEASE = 3.10
LIVESTOCK DISEASE =2.55

Description and History

Communicable diseases, sometimes called infectious diseases, are illnesses caused by organisms such as bacteria, viruses, fungi and parasites. Sometimes the illness is not due to the organism itself, but rather a toxin that the organism produces after it has been introduced into a human host. Communicable disease may be transmitted (spread) either by one infected person to another, from an animal to a human, from an animal to an animal, or from some inanimate object (doorknobs, tabletops, etc.) to an individual. A pandemic is a global disease outbreak. At the time the Stillwater County MHMP was being updated, the coronavirus (COVID-19) pandemic continued with the Delta variant surging and vaccinations available for most county residents but many reluctant to receive it. This is after 15 months of the virus ravaging populations in Montana and around the world. Further details on the pandemic are presented below.

Communicable disease or biological agents could be devastating to the population or economy of Stillwater County. Human diseases when on an epidemic scale, can lead to high infection rates in the population causing isolation, quarantines and potential mass fatalities. Diseases that have been eliminated from the U.S. population, such as smallpox, could be used in bioterrorism.

The following list gives examples of biological agents or diseases that could occur naturally or be used by terrorists as identified by the Centers for Disease Control (CDC) and Prevention (2021).

Category A

Definition - The U.S. public health system and primary healthcare providers must be prepared to address various biological agents, including pathogens that are rarely seen in the United States. High-priority agents include organisms that pose a risk to national security because they:

- Can be easily disseminated or transmitted from person to person;
- Result in high mortality rates and have the potential for major public health impact;
- Might cause public panic and social disruption; and
- Require special action for public health preparedness.

Agents/Diseases:

- Anthrax (Bacillus anthracis)
- Botulism (Clostridium botulinum toxin)
- Plague (Yersinia pestis)
- Smallpox (variola major)
- Tularemia (Francisella tularensis)
- Viral hemorrhagic fevers (Ebola, Marburg, Lassa, Machupo)

Category B

Definition - Second highest priority agents include those that:

- Are moderately easy to disseminate;
- Result in moderate morbidity rates and low mortality rates; and
- Require specific enhancements of CDC's diagnostic capacity and enhanced disease surveillance.

Agents/Diseases:

- Brucellosis (Brucella species)

- Epsilon toxin of Clostridium perfringens
- Food safety threats (e.g., Salmonella species, Escherichia coli O157:H7, Shigella)
- Glanders (Burkholderia mallei)
- Melioidosis (Burkholderia pseudomallei)
- Psittacosis (Chlamydia psittaci)
- Q fever (Coxiella burnetii)
- Ricin toxin from Ricinus communis (castor beans)
- Staphylococcal enterotoxin B
- Typhus fever (Rickettsia prowazekii)
- Viral encephalitis (alphaviruses [e.g., Venezuelan equine encephalitis, eastern equine encephalitis, western equine encephalitis])
- Water safety threats (e.g., Vibrio cholerae, Cryptosporidium parvum)

Category C

Definition - Third highest priority agents include emerging pathogens that could be engineered for mass dissemination in the future because of:

- Availability;
- Ease of production and dissemination; and
- Potential for high morbidity and mortality rates and major health impact.

Agents:

- Emerging infectious diseases such as Nipah virus and hantavirus

These diseases and bioterrorism agents can infect populations rapidly, particularly through groups of people in close proximity such as multi-generational homes, schools, assisted living facilities, and workplaces.

Influenza is a highly contagious viral infection of the nose, throat, and lungs that occurs most often in the late fall, winter, and early spring. It is a serious infection that affects, in an average year, between 5-20 percent of the U.S. population. Each year, more than 200,000 individuals are hospitalized and 3,000-49,000 deaths occur from influenza-related complications (IDSA, 2016). The Montana Department of Public Health and Human Services (DPHHS), maintains statistics of influenza cases in Montana counties. Data for Stillwater County is summarized below.

- 2014-2015 season: 11 influenza cases in Stillwater County with 24 fatalities across the State.
- 2015-2016 season: 7 influenza cases in Stillwater County with 33 fatalities across the State.
- 2016-2017 season: 34 influenza cases in Stillwater County with 56 fatalities across the State.
- 2017-2018 season: 33 influenza cases in Stillwater County with 67 fatalities across the State.
- 2018-2019 season: 38 influenza cases in Stillwater County with 38 fatalities across the State.
- 2018-2019 season: 58 influenza cases in Stillwater County with 38 fatalities across the State.
- 2019-2020 season: 68 influenza cases in Stillwater County with 41 fatalities across the State.

The Spanish influenza outbreak after World War I in 1918-1919 caused 9.9 deaths per 1,000 people in the State of Montana (Brainerd and Siegler, 2002). Historical records from newspapers show that the influenza outbreak was so bad in 1918 that residents were quarantined from November 30 to December 17 after 18 people died and 53 new cases were discovered.

On January 27, 2020, the U.S. Dept. of Health and Human Services Secretary declared a public health emergency for COVID-19, the disease causing the novel coronavirus outbreak, first identified in Wuhan China. On March 11, 2020, the World Health Organization recognized the spread of COVID-19 as a pandemic. As of

September 3, 2021, there were almost 40 million confirmed COVID-19 cases in the United States with 643,744 deaths. The pandemic and response measures have contributed to social and economic disruption and has led to the postponement or cancellation of events. Educational institutions have been partially or fully closed during the 2020/2021 school year.

COVID-19 is a respiratory disease not previously seen in humans that can result in serious illness or death. The virus is thought to spread mainly from person-to-person. Between people who are in close contact with one another (within about 6 feet). Through respiratory droplets produced when an infected person coughs, sneezes or talks. These droplets can land in the mouths or noses of people who are nearby or possibly be inhaled into the lungs. Some recent studies have suggested that COVID-19 may be spread by people who are not showing symptoms. Recommended preventative measures for COVID-19 include hand washing, covering one's mouth when sneezing or coughing, social distancing, wearing a face mask in public, disinfecting surfaces, air-filtering, and monitoring and self-isolation for people exposed or with symptoms. Travel restrictions, lockdowns, workplace hazard controls, and facility closures were implemented to control the spread. Many places worked to increase testing capacity and trace contacts of the infected. Currently, three high-effective vaccines have been approved by the U.S. Food and Drug Administration (two for emergency use) and vaccination of the population is taking place.

On March 15, 2020, the Governor of the State of Montana declared a state of emergency in Montana due to the global outbreak of COVID-19 which closed schools, suspended nursing home visitation. and Mitigation involved requirements that persons wear masks or face covering when they're out in public. Personal Protective Equipment (PPE) protocol (handwashing, social distancing, etc.) was encouraged.

Vector-borne diseases are also a concern in Stillwater County. These are diseases that results from an infection transmitted to humans and other animals by blood-feeding anthropods, such as mosquitoes, ticks, and fleas. Examples of vector-borne diseases include West Nile Virus, Lyme disease, Dengue fever, and malaria.

The Montana DPHHS manages a database of reportable communicable disease occurrences. A summary for Stillwater County is presented in **Table 4.7-1** for the years 2009 to 2018**.**

Table 4.7-1. Communicable Disease Summary for Stillwater County; 2009 - 2018

Disease	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Viral Hepatitis										
Hepatitis C, chronic	-	-	-	9	3	5	9	11	5	9
Vaccine Preventable Diseases										
Pertussis	1	-	-	7	1	3	-	-	-	-
Varicella	-	-	-	-	-	-	-	1	-	1
Invasive Diseases										
Haemophilus influenzae	-	-	-	-	-	-	-	-	-	2
Meningitis, viral	-	-	-	1	-	-	-	-	-	-
Strep Pneumonia	-	-	-	-	-	-	1	1	2	4
Enteric Diseases										
Amebic Dysentery	1	-	-	-	-	-	-	-	-	-
Campylobacteriosis	4	2	2	2	2	6	7	4	8	4
Cryptosporidiosis	1	-	-	-	1	-	-	-	-	2
Giardia	1	-	-	-	-	1	-	1	-	-
Hemolytic Uremic Syndrome	-	-	-	-	-	-	-	-	-	1
Salmonella	3	-	1	-	-	1	3	-	1	-
Shiga-toxin *E. coli*	-	2	-	1	-	-	1	-	3	1
Zoonotic and Vector-Borne Diseases										
Hantavirus	-	-	-	-	-	1	-	-	-	-

Table 4.7-1. Communicable Disease Summary for Stillwater County; 2009 - 2018

Disease	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Rabies	-	-	-	-	-	1	-	-	-	1
Tick Fever	-	-	-	-	-	-	-	-	-	1
West Nile Virus	-	-	-	-	1	-	-	-	1	-
Travel-Associated Diseases										
Legionellosis	-	-	-	-	-	-	-	-	1	1
Other Communicable Diseases										
Sexually Transmitted Diseases	4	97	18	17	6	24	13	21	23	25

Source: Montana DPHHS Communicable Disease Summaries, 2009– 2018

Stillwater County participates in CDC's Public Health Emergency Preparedness (PHEP) Program. CDC's experience and expertise helps U.S. communities prepare for, withstand, and recover from emergencies. They are committed to training and growing a strong public health workforce by providing technical assistance, funding, and partnerships to rapidly identify and respond to public health threats. The PHEP program provides:

- Guidance: Annual evidence-based guidance to ensure state, local, and territorial jurisdictions have the most current information to better protect their communities.
- Technical Assistance: Operational know-how to ensure public health departments are ready to respond.
- Evaluation: Measurement and evaluation of state, local, and territorial jurisdictions' capabilities to prepare for any public health emergency.

The PHEP Program works to advance six main areas of preparedness so state and local public health systems are better prepared for emergencies that impact the public's health.

- Community Resilience: Preparing for and recovering from emergencies.
- Incident management: Coordinating an effective response.
- Information Management: Making sure people have information to take action.
- Countermeasures and Mitigation: Getting medicines and supplies where they are needed.
- Surge Management: Expanding medical services to handle large events.
- Biosurveillance: Investigating and identifying health threats.

In addition to public health emergencies, livestock and animal disease could have a devastating effect on the economy and food supply in Stillwater County and beyond. According to the Montana Department of Livestock, known livestock and animal diseases such as Foot and Mouth, Bovine Spongiform Encephalopathy (Mad Cow Disease), Chronic Wasting Disease, Exotic Newcastle, Rabies, Scabies, and Brucellosis could have damaging effects on the livestock and/or wildlife populations. Losses from these diseases would be devastating and could have an economic effect across the county.

Brucellosis is a nonnative, bacterial disease that induces abortions in pregnant cattle, elk, and bison. Cattle brought brucellosis to the Yellowstone National Park area in the early 1900s and transmitted it to local wildlife populations. The bacteria that causes the disease can be transmitted between animals if they come into contact with infected birth tissues.

Chronic wasting disease (CWD) is a fatal, infectious central nervous system disease that affects cervid species such as deer, elk, moose, and caribou. CWD can only be confirmed by testing specific tissues from an animal after it is dead. There is no known cure. Although there has yet to be a human case of CWD identified, government officials are recommending hunters avoid eating meat from animals found to be CWD-positive. CWD has been found to exist in deer populations in parts of Montana.

Vulnerability and Area of Impact

Diseases threaten the population of Stillwater County as opposed to structures. The entire population is at risk for contracting disease. Given the uncertain nature of diseases, Stillwater County is assumed to have the same communicable disease risk across the county. The number of fatalities in the county would depend on the mortality (disease/agent attack) rate and the percentage of the population affected. The ability to control the spread of disease will be dependent on the contagiousness of the disease and movement of the population.

Probability and Magnitude

The magnitude of a communicable disease outbreak varies from common viral outbreaks to widespread bacterial infection. During the 1918 influenza pandemic, infection rates approached 28 percent in the United States (Billings, 1997). Other pandemics produced infection rates as high as 35 percent of the total population (World Health Organization, 2009).

During 2020, the COVID-19 virus entered the regional population and overwhelmed local health resources with over 4,600 hospitalization statewide. At this time, there are three vaccines available and cases of COVID-19 appear to be remission; however, several highly contagious variants have emerged. The pandemic represents a severe magnitude event. As of September 3, 2021, there were 128,835 confirmed cases of COVID-19 in Montana and 1,807 deaths. As of this date, in Stillwater County there were 828 confirmed COVID-19 cases and 16 deaths.

The probability of a future disease outbreak in Stillwater County is difficult to assess. Individual infectious diseases will likely be reported on an annual basis giving this hazard a probability rating of “highly likely”. The Stillwater County MHMP Planning Team rated the communicable disease hazard to livestock as “likely”, an event that occurs more than once a decade but not every year.

Future Development

There are no land use regulations for future development that could impact the communicable disease hazard. New residents and population add to the number of people threatened in the county, but the location of such population increases would not increase their vulnerability to the hazard.

Unexpected Weather Event

The effects of Unexpected Weather Event on the communicable disease hazard are mainly to the population. Outbreaks of insect- and water-borne infection associated with higher temperatures could increase population exposure; especially vulnerable would be the young and elderly. Property and critical facilities are not expected to have an increase in disease exposure or vulnerability due to the effects of Unexpected Weather Event.

Although some evidence indicates that warming may be causing infectious disease to spread, predicting how Unexpected Weather Event will ultimately influence the incidence of diseases transmitted by insects remains challenging. More predictable as Unexpected Weather Event unfolds is the spread of waterborne infections. These infections most often cause diarrheal illness and flourish in the wake of heavy rainfalls as runoff from land enters into and may contaminate water supplies. Many pathogens that cause diarrheal disease reproduce more quickly in warmer conditions as well (Harvard School of Public Health, 2016).

Awareness has been growing in recent years about zoonotic diseases— that is, diseases that are transmissible between animals and humans, such as Lyme disease and West Nile virus. The rise of such diseases results from closer relationships among wildlife, domestic animals, and people, allowing more

contact with diseased animals, organisms that carry and transmit a disease from one animal to another (vectors), and people. Disease vectors include insects, such as mosquitoes, and arachnids, such as ticks. Thus, it is impossible to separate the effects of global warming on wildlife from its effects on the health of domestic animals or people (USGS, 2012).

Warmer water temperatures are likely to cause the habitat ranges of many fish species to shift, which could disrupt ecosystems. Fisheries will be affected by changes in water temperature that make waters more hospitable to invasive species and shift the ranges or lifecycle timing of certain fish species (EPA, 2017).

4.8 Hazardous Material Incidents and Transportation Accidents

CPRI SCORES:
AIRCRAFT ACCIDENTS = 2.55
HAZ-MAT INCIDENTS = 2.35
RAILROAD ACCIDENJTS = 2.30
PIPELINE SPILLS = 1.95

Description and History

Hazardous material incidents in Stillwater County are rare but when they do happen, are often associated with the county's highways, railroads, and/or pipelines. Hazardous material incidents also occur at fixed facilities which in Stillwater County include bulk propane and agricultural chemical distributors, gas stations and/or mining-related facilities. Transportation accidents can occur on the highways, railroad, or in the air and often result in fatalities and injuries but rarely in property loss unless hazardous materials are involved. Because of the potential for future incidents involving hazardous materials on the transportation corridors in Stillwater County these two hazards are profiled together.

Hazardous Material Incidents

A hazardous material release is the contamination of the environment (i.e. air, water, soil) by any material that because of its quantity, concentration, or physical or chemical characteristics threatens human health, the environment, or property. Hazardous materials, including petroleum products and chemicals, are commonly stored and used in Stillwater County and are regularly transported via the region's roadways, railroads, and through pipelines. A release of hazardous materials from both fixed and transportation incidents pose possible threats involving emergency response. Hazards range from small spills on roadways to major releases from railways or pipeline spills that contaminate land and water. According to the MHMP Planning Team, numerous pipelines exist in Stillwater County, including Front Range Pipeline LLC; however, to date, there have been no ruptures or spills.

The pipeline operators periodically conduct liaison activities with emergency response organizations to establish and maintain a mutual understanding regarding cooperation and coordination of response efforts. *Pipeline Emergency Response Guidelines* include responsibilities for 911 Centers and Pipeline Control Centers, Pipeline Operators, Emergency Responders, and Incident Commander/ Pipeline Operator's Representative.

Hazardous material incidents in Stillwater County have mostly been minor. Records of hazardous material events from 1990 to 2020, available from the National Response Center database, are summarized in **Table 4.8-1**.

Table 4.8-1. Stillwater County Hazardous Material Incidents; 1990 - 2020

Incident Date	Type of Incident	Incident Cause	Location	Nearest City	Quantity Spilled/ Material Name	Responsible Party
3/30/1993	Fixed	Equipment Failure	HC 54	Nye	5 gal. Fuel Oil	Stillwater Mining Co.
5/301994	Unknown Sheen	Unknown	Midnight Canyon	Beehive	0.25 gal. Motor Oil	Unknown
2/10/1997	Fixed	Equipment Failure	9 mi. N. of Molt	Molt	40 gal. Ethylene Glycol	Equitable Resources Energy
3/31/1997	Mobile	Operator Error	Hwy 301	Molt	150 gal. Fuel Oil	Cenex Transportation
7/5/2000	Fixed	Operator Error	Hwy 64	Nye	3 gal. PCBs	Stillwater Mining Co.
7/21/2001	Pipeline	Explosion	Davidson/Grove	Absarokee	Natural Gas	Montana Power Company
1/14/2002	Storage Tank	Other	2562 Nye Rd.	Nye	688 lbs Copper Sulfate	Stillwater Mining Co.
8/22/2002	Railroad	Equipment Failure	MP 57, 2nd Sub.	Reed Point	Non-Release	Unknown
10/30/2004	Storage Tank	Operator Error	2562 Nye Rd.	Nye	130 gal. Waste Oil	Stillwater Mining Co.
9/16/2005	Fixed	Other	3 mi. east	Columbus	Tires	Unknown
6/12/2006	Railroad	Equipment Failure	MRL	Craver	Non-Release	Unknown

Table 4.8-1. Stillwater County Hazardous Material Incidents; 1990 - 2020

Incident Date	Type of Incident	Incident Cause	Location	Nearest City	Quantity Spilled/ Material Name	Responsible Party
2/22/2018	Mobile	Operator Error	602 E 8th Ave	Columbus	Herbicide	Fort Transfer Co
1/15/2019	Mobile	Equipment Failure	96 S Grove Crk Rd	Fishtail	Ethylene Glycol	Unknown

Source: National Response Center, 2021 (http://www.nrc.uscg.mil/FOIAfiles)

The Emergency Planning and Community Right-to-Know Act (EPCRA) was enacted in 1986 to inform communities and citizens of chemical hazards in their areas. Sections 311 and 312 of EPCRA require businesses to report the locations and quantities of chemicals stored on-site to state and local governments in order to help communities prepare to respond to chemical spills and similar emergencies. EPCRA Section 313 requires the U.S. Environmental Protection Agency (EPA) and the states to annually collect data on releases and transfers of certain toxic chemicals from industrial facilities and make the data available to the public in the Toxics Release Inventory (TRI). In 1990 Congress passed the Pollution Prevention Act which required that additional data on waste management and source reduction activities be reported under TRI. The goal of TRI is to empower citizens, through information, to hold companies and local governments accountable in terms of how toxic chemicals are managed. Three active TRI facilities are located in Stillwater County, as shown in **Table 4.8-2**.

Table 4.8-2 – Stillwater County Toxic Release Inventory – Total Aggregate Releases

Facility Name & Address	Total On-site Disposal (pounds)	Total Off-site Disposal (pounds)	Total On- and Offsite Disposal (pounds)
Montana Silversmiths, 1 Sterling Ln, Columbus, MT			
2019	5,321	0	5,321
2018	5,214	0	5,214
Chemicals: Copper Compounds, Dichloromethane, Nickel Compounds, Zinc Compounds			
Sibanye-Stillwater Mining Company, Nye Mine Site, 5 miles SE of Nye, Highway 419, Nye, MT			
2019	309,128	468,017	777,145
2018	476.395	425.211	901,606
Chemicals: Chromium Compounds, Copper Compounds, Lead Compounds, Mercury Compounds, Methanol, Nickel Compounds, Nitrate Compounds, Propylene, Styrene			
Sibanye-Stillwater Mining Company, Precious Metals Smelter & Base Metals Refinery, Columbus Industrial Park, 1st Ave. South, Columbus, MT			
2019	746	0	746
2018	675	0	675
Chemicals: Barium Compounds, Chromium Compounds, Cobalt Compounds, Copper Compounds, Lead Compounds, Manganese Compounds, Mercury Compounds, Nickel Compounds, Zinc Compounds			

Source: EPA, 2021; (http://www.epa.gov/enviro/html/tris/tris_query.html)

Submission of Tier II forms are is required under Section 312 of the EPCRA. The purpose of this form is to provide State, local officials, and the public with specific information on potential hazards. This includes the locations, as well as the amount, of hazardous chemicals present at the facility during the previous calendar year. Facilities in Stillwater County that have Tier II reporting requirements are shown in **Table 4.8-3.**

Table 4.8-3. Stillwater County Tier 2 Hazardous Material Reporters

Facility Name	Location
AT&T Communications of Montana	180 Big Timber Rd, Rapelje, MT, 59067
AT&T-MT3060	FT2W-BLNGMTMA, Columbus, MT, 59019
Bayswater-Keating 9-26	Rural, Molt, MT, 59067
Bayswater-Lake Basin Compressor Station	Rural, Molt, MT, 59057
Century Link Park City Central Office	40 1st St SW, Park City, MT, 59063-0000
Century Link Columbus Central Office	550 E 1st Ave N, Columbus, MT, 59019-0547

Table 4.8-3. Stillwater County Tier 2 Hazardous Material Reporters

Facility Name	Location
CHS, Inc.-Central Montana Coop, Columbus Store	1 S Pratten, Columbus, MT, 59019
Columbus Co.	550 E 1st Ave N, Columbus, MT, 59019-0547
Git's Conoco	740 Pike Ave, Columbus, MT, 59019
Montana Silversmiths, Inc.	1 Sterling Lane, Columbus, MT, 5019
NW Energy-Montana Mystic Lake Dam Powerhouse	4209 West Rosebud Road, Fishtail, MT, 59028
Park City CDO	40 1st St SW, Park City, MT, 59063-0000
PPL Montana-Mystic Lake Dam Powerhouse	4209 W Rosebud Rd, Fishtail, MT, 59028
Silvertip Propane, Columbus	2 Noble Lane, Columbus, MT, 59019
Stillwater Mining Co.-Base Metals Refinery	1730 E 1st Ave S, Columbus, MT, 59019
Stillwater Mining Co.-Precious Metals Smelter	1891 E 1st Ave S, Columbus, MT, 59019
Stillwater Wind	2A Eder Road, Reed Point, MT, 59069
Verizon Wireless DT Columbus	1050 East 8th Avenue North, Columbus, MT, 59019
Verizon Wireless Park City	50A North Frontage Road, Park City, MT, 59063

Source: Stillwater County DES, 2021

The source and location of transportation accidents vary but the response is typically the same. Response is focused on determining the presence of hazardous materials and then assisting the injured. The regional hazardous-material response teams closest to Stillwater County is positioned an hour away in Billings.

There have been no federal or state disaster declarations associated with hazardous material incidents in Stillwater County.

Highway Accidents

Car crashes occur in every community across the nation and can be devastating to families, friends, and communities. It is estimated that vehicle crashes cost the State approximately $595 million in wage loss, medical expenses, insurance administration, and property damage. This figure does not account for the indirect costs of human suffering and loss resulting from these tragedies. Vehicular accidents occur for a number of reasons including distracted drivers, driver fatigue, drunk driving, speeding, aggressive driving, and weather. In Montana vehicle collisions with wildlife are a common occurrence.

Statistics on highway accidents in Stillwater County over the most recent 10 year period are presented in **Table 4.8-4**. Information is not available on whether these incidents involved a hazardous material response.

Table 4.8-4. Stillwater County Vehicular Crashes; 2009 – 2018

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	TOTAL
All Crashes											
Fatal Crash	1	1	2	2	4	0	2	6	2	2	**22**
Serious Injury Crash	6	9	14	16	26	8	8	13	5	10	**115**
Total # of Crashes	*394*	*385*	*305*	*353*	*441*	*454*	*439*	*423*	*453*	*476*	***4,123***
Rural Roadway Crashes											
Fatal Crash	1	1	2	2	4	0	2	6	2	1	**21**
Serious Injury Crash	6	9	14	16	25	8	8	13	5	9	**113**
Total # of Crashes	*367*	*348*	*289*	*329*	*397*	*431*	*426*	*392*	*436*	*432*	***3,847***
Animal Involved Crashes											
Fatal Crash	0	0	0	0	0	0	0	0	0	0	**0**
Serious Injury Crash	2	0	0	1	0	0	0	1	0	1	**5**
Total # of Crashes	*127*	*46*	*92*	*95*	*74*	*63*	*101*	*135*	*103*	*147*	***983***

Source: MDT, 2021 (http://www.mdt.mt.gov/publications/datastats/crashdata.shtml).

There is no history of a mass casualty accident in Stillwater County involving a school bus, mine transport bus, or tour bus. According to the MHMP Planning Team, four patients are considered a mass casualty incident for the local hospital.

Railroad Accidents

Montana Rail Link Railroad (MRL) and now BNSF passes through the central portion of Stillwater County. Railroad related hazards such as derailments, toxic spill contamination, blocked evacuation routes and vehicle collisions are a threat to Montana communities. According to the MHMP Planning Team, MRL has operated a transload facility in Park City for the past three years and there have been no incidents.

There are several public at-grade railroad crossings in Stillwater County. According to the National Transportation Safety Board (NTSB), 60 percent of all railroad accidents occur at unprotected or passive crossings. There has been two fatalities and one injury at railroad crossings in Stillwater County in the past 45 years, as shown in **Table 4.8-5**.

Table 4.8-5. Stillwater County Accidents at Railroad Crossings: 1975 – 2020

Date	Nearest Town/ RR Station	Road	Road Type	Fatalities	Injuries	Crossing Protection
1/1/1977	Columbus	Not listed	Public	0	0	Flashing Lights
10/29/1978	Columbus	Pratten Street	Public	0	0	Highway Traffic Signals
1/20/1980	Columbus	Pratten Street	Public	0	0	Flashing Lights
7/25/1980	Park City	Private	Private	0	0	None
12/8/1980	Columbus	Pratten Street	Public	1	0	Gates
2/8/1986	Columbus	Pratten Street	Public	0	0	Gates
9/13/1987	Spurling	Valley Creek Rd.	Public	0	0	Stop Signs
8/28/1989	Spurling	Square Butte Rd.	Public	0	1	Stop Signs
8/19/1995	Craver	Private	Private	0	0	None
6/28/1996	Spurling	Private	Private	0	0	Stop Signs
9/1/1999	Columbus	Private	Private	1	0	Stop Signs
7/8/2000	Reed Point	Reed Point Road	Public	0	0	Stop Signs
8/1/2000	Rapids	Special K Lane	Private	0	0	Stop Signs
5/31/2004	Columbus	Pratten Street	Public	0	0	Cross Bucks
12/1/2007	Park City	Pope Road	Public	0	0	Stop Signs
5/17/2008	Park City	Riverview Road	Private	0	0	Stop Signs
6/30/2008	Park City	Riverview Road	Private	0	0	Stop Signs
TOTAL				**2**	**1**	

Source: Federal Railroad Administration, 2021; http://safetydata.fra.dot.gov/OfficeofSafety/publicsite/Query/gxrabbr.aspx

Federal Railroad Administration data indicates that that between 1975 and 2020, 18 railroad accidents occurred in Stillwater County, including four derailments that involved railcars carrying hazardous materials (**Table 4.8-6**). None of these incidents involved a hazardous material release.

Table 4.8-6 Stillwater County Railroad Accidents; 1975 - 2020

Date	Nearest Town	Injuries	Fatalities	Cars Carrying Haz-Mat	Haz-Mat Cars Damaged	Comments
1/31/1975	Columbus	0	0	0	0	-
4/11/1975	Reed Point	0	0	0	0	-
7/5/1975	Columbus	0	0	0	0	26 railcars derailed.
6/28/1981	Reed Point	0	0	0	0	-
5/20/1982	Spurling	0	0	0	0	1 railcar derailed.

Table 4.8-6 Stillwater County Railroad Accidents; 1975 - 2020

Date	Nearest Town	Injuries	Fatalities	Cars Carrying Haz-Mat	Haz-Mat Cars Damaged	Comments
1/12/1986	Reed Point	0	0	1	1	15 cars derailed. No HM released
5/21/1989	Columbus	0	0	0	0	9 railcars derailed.
4/25/1990	Quebec	0	0	0	0	22 railcars derailed.
4/13/1991	Spurling	0	0	0	0	8 railcars derailed.
9/18/1995	Spurling	0	0	0	0	2 engines & 6 cars derailed.
6/9/1996	Reed Point	0	0	3	0	3 cars derailed. No HM released
8/1/2000	Rapids	0	0	12	0	No haz-mat released.
10/23/2001	Craver	0	0	0	0	10 railcars derailed.
8/22/2002	Reed Point	0	0	0	0	3 engines & 16 cars derailed.
6/12/2006	Craver	0	0	14	11	11 cars derailed. No HM released
12/31/2014	Columbus	0	0	0	0	2 railcars derailed.
9/10/2018	Reed Point	0	0	0	0	1 railcar derailed.
9/25/2018	Columbus	0	0	0	0	41 railcars derailed.
06/24/2023	Reed Point	0	0	16	9	17 railcars derailed
TOTAL		**0**	**0**	**46**	**12**	

Source: Federal Railroad Administration, 2021; http://safetydata.fra.dot.gov/OfficeofSafety/publicsite/Query/incabbr.aspx

Oil trains are a constant concern because of the catastrophic impacts that could result from a derailment that ruptures an oil tanker in town or into waterways. A derailment into the river could impact the fishery.

24 June 2023 – A MRL train derailed outside of Red Point and the railroad bridge collapsed across the Yellowstone River spilling asphalt liquid petroleum and molten sulfur into the Yellowstone River. Seventeen (17) cars derailed on the mainline track and into the river when the bridge collapsed. No one was injured. This was one of the most impactful train derailments in Montana's history. Unified Command was created between Stillwater County DES, Montana DEQ, Environmental Protection Agency, and Montana Rail Link. The recovery process is still ongoing.

Aircraft Accidents

Aviation accidents can occur for a multitude of reasons from mechanical failure to poor weather conditions to pilot error. They usually don't involve a hazardous material release but are often fatal to the occupants. Stillwater County has a small airport in Columbus. Federal Aviation Administration (FAA) database listings for aircraft accidents in Stillwater County are presented in **Table 4.8-7.** There have been seven fatalities due to aircraft accidents since 1964 in Stillwater County. A 2007 helicopter crashed is described below.

Table 4.8-7. Stillwater County Aircraft Accidents

Date	Location	Aircraft Make	Fatalities	Date	Location	Aircraft Make	Fatalities
7/31/1964	Fishtail	ERCOUPE 415C	Nonfatal	5/13/1985	Rapelje	PIPER PA-36	Nonfatal
5/26/1966	Columbus	PIPER PA-18	Nonfatal	7/12/1985	Columbus	PIPER J3C-65	Fatal(2)
6/14/1966	Columbus	Navion A	Nonfatal	3/27/1987	Columbus	Aeronca 7AC	Nonfatal
8/14/1967	Columbus	Piper PA-24	Nonfatal	4/10/1989	Rapelje	Cessna A188B	Nonfatal
3/17/1968	Fishtail	Cessna 182	Nonfatal	10/18/1991	Columbus	Cessna 172N	Fatal(3)
8/10/1969	Rapelje	Piper PA-22	Nonfatal	1/6/1996	Park City	Cessna 172K	Nonfatal
4/7/1974	Fishtail	Taylorcraft DCO-65	Nonfatal	9/9/1997	Columbus	Bellanca 7GCBC	Nonfatal
6/9/1976	Fishtail	Cessna 205	Nonfatal	7/26/1998	Columbus	Piper PA-18	Nonfatal
7/31/1976	Fishtail	Cessna 170	Nonfatal	9/4/1999	Columbus	Bellanca 7GCBC	Nonfatal
8/28/1979	Absarokee	Bell 206B	Nonfatal	6/4/2004	Columbus	Piper PA-18-150	Nonfatal
1/28/1981	Columbus	Bell 206B	Nonfatal	7/20/2005	Park City	Piper PA-16	Nonfatal
7/31/1981	Park City	Aero Comdr A-9B	Fatal(1)	5/28/2007	Columbus	Hughes 369D	Fatal(1)
6/21/1982	Near Rapelje	Weatherly 201C	Nonfatal			**TOTAL**	**7 Fatalities**

Source: FAA, 2021; https://www.ntsb.gov/_layouts/ntsb.aviation/

May 28, 2007 – A helicopter went down in a field off Stiles Road about eight miles from Broadview in northeastern Stillwater County. The crew had been conducting fly-over inspections of power lines. The wreckage generated a plume of smoke that could be seen for miles and ignited a grass fire. Of the two survivors, one had broken lower extremities and the other had a back and head injury. (Billings Gazette, *Copter Crash Near Broadview Kills 1 Man, Injures 2*, May 28, 2007).

Vulnerability and Area of Impact

The potential for a hazardous material accident in Stillwater County is present, in part due to the number of semi-trucks and trailers using highways and roads in the county, the railroad, and the petroleum pipelines. Use of hazardous materials at fixed facilities is also present at various locations throughout the county. Although there is no history of significant hazardous material incidents in Stillwater County, the potential is present.

Use of hazardous materials at fixed facilities is also present at various locations throughout the county. Industries in Stillwater County that utilize hazardous materials and petroleum products consist of a large platinum-palladium mine, the mine's laboratory, and metallurgical complex. These facilities operate in compliance with state and federal regulations but have the potential for hazardous material spills.

The volume and type of hazardous materials that flow into, are stored, and flow through communities will determine exposure to a potential release of hazardous materials. An accidental or intentional release of materials could produce a health hazard to those in the immediate area, downwind, and/or downstream.

Privately-owned vehicles provide transportation for individuals in Stillwater County using the state highway systems as well as county and private roads. Trucks and trailers carry interstate and intrastate cargo. Highway accidents caused by severe weather and high speeds occur frequently.

Railroad related hazards such as derailments, toxic spill contamination, and vehicle collisions are a threat to Stillwater County residents. The MHMP Planning Team indicated that an emergency crossing is needed east of the Sibanye-Stillwater Metallurgical Complex in Columbus.

According to the NTSB, more than 80 percent of public railroad crossings do not have lights and gates, and 60 percent of all railroad accidents occur at these unprotected crossings. Currently, the closest haz-mat team to Stillwater County is located in Billings, an hour away.

Probability and Magnitude

Stillwater County is vulnerable to all types of hazardous material and transportation accident emergencies. The major effects of these incidents are loss of life or injury, environmental degradation, and economic impact. It is not common for structural loss to be a consequence.

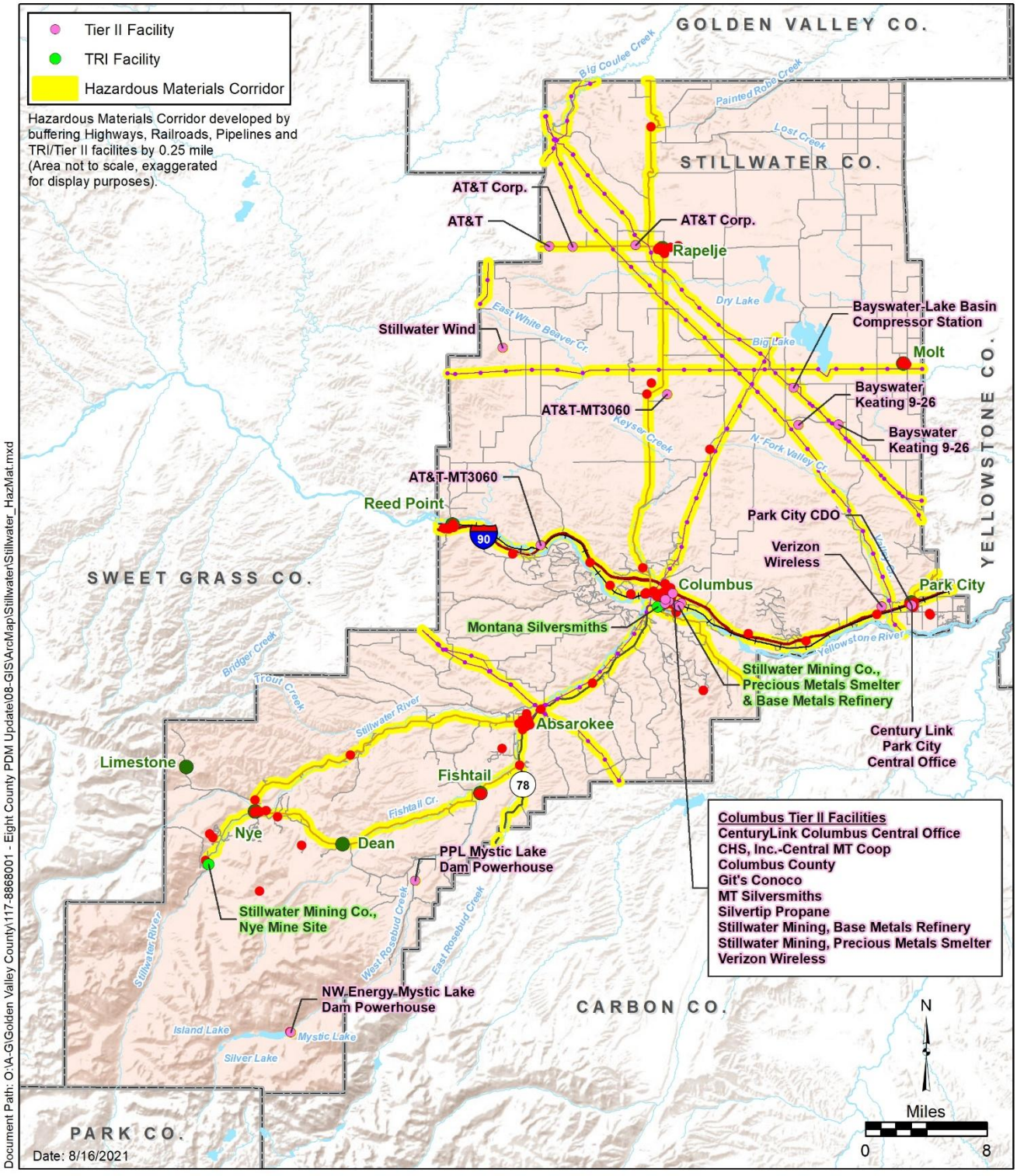
According to the U.S. Department of Transportation, Office of Hazardous Materials Safety, four hazardous material releases are reported for Stillwater County; all involving highway accidents. Three of these incidents had reported damages (**Table 4.8-8**).

Table 4.8-8. Stillwater County Hazardous Material Incidents with Damages

Date	Location	Carrier	Quantity Released	Commodity Released	Damages	Mode of Transport
9/1/1976	Rapelje	Farmers Union Central Exchange	20 gallons	Fuel Oil	$0	Highway
3/28/1997	Molt	Cenex Transportation	100 gallons	Diesel Fuel	$3,077	Highway
6/12/1997	Columbus	Advance Environmental Tech.	10 gallons	Flammable Liquid	$200	Highway
1/11/2013	Columbus	Savannah Transport Inc.	20 gallons	Hazardous Waste	$118,000	Highway

Source: U.S. Dept. Transportation, 2021; https://portal.phmsa.dot.gov/analytics

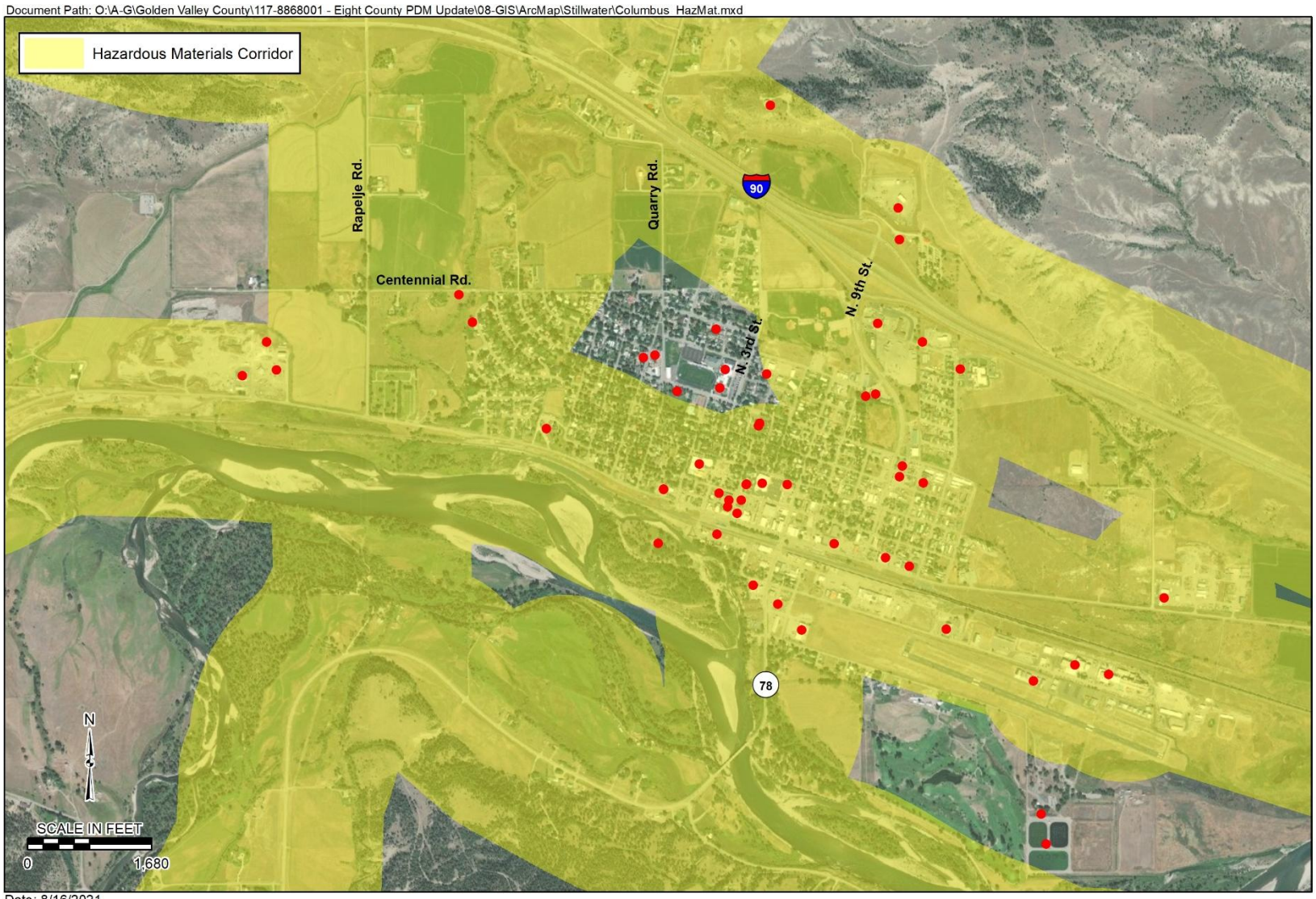
To model the spatial distribution of hazardous material incident risk a GIS layer of transportation arteries was used, which included highways, major roadways, railroads, and pipelines. Fixed facilities, including TRI and Tier II sites, were added to this layer and it was then buffered by 0.25 miles. **Figures 9 and 9A** present the hazardous material buffer used for the MHMP analysis in Stillwater County and Columbus, respectively, and the vulnerability of critical facilities**. Table 4.8-9** presents the results of the risk assessment.



Legend

Critical Facility · Town · Pipeline · Railroad · Interstate · Primary Road · Secondary Road · City-County Road · Stream · Lake · County Boundary

Figure 9
Hazardous Material and Transportation Buffer
Stillwater County, Montana
Multi-Hazard Mitigation Plan



Legend

- Critical Facility

Figure 9A
Hazardous Material and Transportation Buffer - Columbus
Stillwater County, Montana
Multi-Hazard Mitigation Plan

Table 4.8-9. Stillwater County Vulnerability Analysis; Haz-Mat Incidents

Category	Stillwater Co. (balance)	Columbus (City)
Residential Property Exposure $	$277,248,032	$83,347,354
# Residences at Risk	1,463	590
Commercial, Industrial & Agricultural Property Exposure $	$67,747,281	$57,934,176
# Commercial, Industrial & Agricultural Properties at Risk	308	89
Critical Facilities Exposure Risk $	$88,083,619	$80,941,240
# Critical Facilities at Risk	99	34
Bridge Exposure $	$60,275,927	$0
# Bridges at Risk	88	0
Persons at Risk	1,835.5	1327
Persons Under 18 at Risk	687.6	277
Persons Over 65 at Risk	775.4	313

The GIS analysis indicates that there are over 109,884 acres in Stillwater County (9.6 percent) in the hazardous material buffer including 2,053 residences, 397 commercial/agricultural and industrial buildings, and 133 critical facilities. The *Hazardous Material Incident* section in **Appendix C-3** lists the critical facilities and bridges within the hazardous material transportation buffer.

The history of hazardous material incidents in Stillwater County indicates 13 minor events over the past 30 years. As such, the probability of future events is rated as "likely"; an event that happens more than once a decade but not every year. The magnitude of any hazardous material event would depend on the amount and material spilled. The MHMP Planning Team rated the hazardous material incident hazard as "likely", the railroad accident hazard as "possible" and the probability of a pipeline spill as "unlikely".

Stillwater County is vulnerable to vehicular accidents. In the past 10 years, there have been 4,123 motor vehicle accidents in Stillwater County, including 22 crashes involving fatalities and 115 crashes resulting in severe injuries. Therefore, the probability of highway accidents is rated as "highly likely".

The MHMP Planning Team rates the probability of railroad accidents as "possible", an event that occurs less than once each decade. In the past 45 year, 18 derailments have occurred plus 2 fatalities at railroad crossings.

Seven fatalities have occurred in Stillwater County from aircraft accidents over the past 57 years resulting in a hazard ranking of "likely", an event that occurs more than once a decade but not every year. The MHMP Planning Team ranked the aircraft accident hazard as "possible".

Future Development

Stillwater County has no land use regulations that specifically restrict building around industrial facilities or along transportation routes or in the vicinity of facilities that store hazardous materials or petroleum products. However, impacts to public health and safety are considered for all new subdivisions.

Unexpected Weather Event

Hazardous material incidents and transportation accidents are not expected to increase as a result of Unexpected Weather Event. No increase in exposure or vulnerability to the population, property, or critical facilities are expected to occur. Unexpected Weather Event is not anticipated to directly impact the

transportation accident hazard. Secondary impacts to public health may result due to increased smoke from wildfire activity which may increase highway accidents.

4.9 Terrorism, Violence, Civil Unrest, and Cyber Security

CPRI SCORES
CYBER SECURITY = 2.45
TERRORISM, VIOLENCE, CIVIL UNREST = 2.30

Description and History

Terrorism is defined in the Code of Federal Regulations as "the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives". Terrorists look for visible targets where they can avoid detection before or after an attack such as international airports, large cities, major international events, resorts, and high-profile landmarks. Bombings involving detonated and undetonated explosive devices, tear gas, and pipe and firebombs have been the most frequently used terrorist method in the United States. Other possible methods include attacks on transportation routes, utilities, or other public services, or incidents involving chemical or biological agents.

The terrorism incident that most significantly impacted the United States occurred on September 11, 2001. On the morning of September 11th, four commercial airliners took off from several airports across the northeastern United States. These airliners were hijacked mid-flight by 19 al-Qaeda terrorists. Two of the planes crashed into the north and south towers of the World Trade Center complex in Lower Manhattan. Within two hours, both 110 story towers collapsed. A third flight was hijacked over Ohio and crashed into the west side of the Pentagon in Arlington County, Virginia, which led to a partial collapse of the west side of that building. The fourth and final plane crashed into a field near Shanksville, Pennsylvania after a struggle between passengers and hijackers. The attacks resulted in 2,977 fatalities, over 25,000 injuries, and substantial long-term health consequences, in addition to at least $10 billion in infrastructure and property damage. It remains the deadliest terrorist attack in human history and the single deadliest incident for firefighters and law enforcement officers in the history of the United States, with 340 and 72 killed, respectively.

The Federal Bureau of Investigation (FBI) defines domestic terrorism as violent, criminal acts which are committed by individuals and/or groups in order to further ideological goals stemming from domestic influences, such as those of a political, religious, social, racial, or environmental nature. Domestic terrorism is often linked to lone wolf terrorism, an act of terrorism committed by one person who “acts on his or her own without orders from – or even connections to an organization”

Civil unrest typically occurs when large groups, organizations, or distraught individuals take action with potentially disastrous or disruptive results. Civil unrest can be the product of another event that creates panic in the community. Looting commonly occurs with these types of events.

Montana had an instance of domestic terrorism from anti-government extremists, as described below.

The Montana Freemen were an anti-government militant movement based outside the town of Jordan, in Garfield County, Montana. They espoused belief in the doctrine of individual sovereignty and rejected the authority of the federal government, above taxation or any kind of federal regulation. Their justification came from interpretation of legal codes, documents from the nation’s foundation and Bible quotations. That ideology, passed along during seminars resulted in about $1.8 million in fraudulent funds.

On March 2, 1995, William Stanton, a Garfield County rancher, became the first Montana resident ever convicted of terrorism. The following day, four armed men who called themselves the "Garfield County Freemen" were arrested when they entered the Musselshell County Courthouse and tried to file papers protesting the seizure of a member’s farm by the Internal Revenue Service. In late 1994, foreclosure proceedings were initiated against the farm and the Freemen refused to be evicted from the land. The FBI initiated a sting operation aimed at one of the Freemen's financial programs, which led to the arrest of two

members of the group in March 1996. The FBI also had warrants for eight other persons suspected to be on the farm, but before they were able to arrest them an armed confrontation developed, and the FBI withdrew to a safe distance to avoid violence. After 81 days of negotiations, the Freemen surrendered to authorities on June 14, 1996. Members of the group were convicted on up to 25 counts including conspiracy, bank fraud, and firearms violations and received between 5 and 22 year prison sentences. (Billings Gazette, *Beliefs, Fear and Anger: the Roots of the Freemen Still Entrenched 25 Years Later*, May 9, 2021).

Lone gunman shootings (active shooters) are another form of terrorism. In the U.S., lone gunman shootings have occurred at schools, movie theaters, night clubs, concerts, and other locations. Most lone gunman shootings occur where a specific place was deliberately selected as the location for the attack and was not simply a random site of opportunity. These shootings have sparked a political debate over gun violence and whether there should be stricter gun control.

Violent protests and riots resulting from police brutality against African Americans gained widespread notoriety in the 2010s. The Black Lives Matter Movement, a social media hashtag, originated in the African American community in 2013 after the acquittal of George Zimmerman in the shooting death of African-American teen Trayvon Martin. The movement became nationally recognized for street demonstrations following the 2014 death of two African Americans, that of Michael Brown, resulting in protests and unrest in Ferguson, Missouri and Eric Garner in New York City. The movement returned to national headlines and gained further international attention during the global protests in 2020 following the murder of George Floyd by a Minneapolis police officer. The movement regularly protests police killings of black people and broader issues of racial profiling, police brutality, and racial inequality but they center on criminal justice reform.

There has been a rise in threats and violent acts against school boards in some parts of the county in opposition to policies requiring masks for students and teachers as part of efforts to combat the spread of the highly contagious Delta variant of the COVID-19 virus in schools. As of the date of this report, children under the age of 12 are not yet eligible for vaccines protecting against COVID-19, and the CDC recommends universal indoor masking for all students, teachers and staff regardless of vaccination status. Across the country, school board meetings have been disrupted by protesters objecting to mask requirements (CBSnew.com, 2021).

According to the Southern Poverty Law Center (SPLC, 2021), an organization devoted to tracking hate groups in the United States, hate groups vilify others because of their race, religion, ethnicity, sexual orientation or gender identity – prejudices that strike at the heart of our democratic values and facture society along its most fragile fault lines. According to the SPLC, six hate groups operate in Montana, including several white nationalist, anti-Muslim and racist groups. Those groups with state-wide presence include the American Freedom Party (white nationalist), American Front (racist skinhead), International Conservative Community (white nationalist), and Proud Boys (general hate). There were no hate groups specifically identified in Stillwater County.

No disaster declarations have been issued to Stillwater County for terrorism, violence, or civil unrest. However, several emergency declarations were issued in Montana to activate the National Guard to assist with these types of situations (**Table 4.9-1**). Within the last 25 years there have been two teachers' strikes that had incidents of violence against those who crossed the picket lines and those that were vocal about their opinions.

Table 4.9-1. Montana Terrorism, Violence and Civil Unrest Emergency Declarations

Declaration	Date	Magnitude	Comments
N/A	Jan-Feb 1979	Activation of National Guard for State Institutions strike	No casualties; $1,393,714 costs
State EO-03-91	April 1991	Activation of National Guard and Assistance Statewide for State Institutions Strike	No casualties

Table 4.9-1. Montana Terrorism, Violence and Civil Unrest Emergency Declarations

Declaration	Date	Magnitude	Comments
State EO-10-96	April 23,1996	Incident Response for Anniversary of Waco and Oklahoma City Incidents	No casualties; $4,368 costs
State EO-23-01	September 11, 2001	Emergency Declaration following the World Trade Center and Pentagon terrorist attacks	No casualties
State EO 26-01	September 28, 2001	National Guard activation to provide personnel for airport security	No casualties

Source: DES, 2018.

Energy development in Montana has made terrorism, violence, and civil unrest an emerging hazard despite its boom-and-bust economy. Below are descriptions violence related to energy development.

Billings Pipeline Protest – On December 1, 2016, more than 50 people gathered in downtown Billings to protest the Dakota Access Pipeline and march through the downtown Wells Fargo bank building in an attempt to pressure the banking company to withdraw funding from the project. Before the protest, participants circled the Yellowstone County Courthouse lawn for a sacred pipe blessing, smudging ceremony and prayer. An effigy of a black snake was present at the protest and eventually held aloft by several people as protesters walked through the Wells Fargo lobby and sang protest songs before exiting onto N. 27th Street. The protest was part of a national call to action from the Standing Rock Sioux Tribe. (Billings Gazette, *Group Protests Dakota Access Pipeline at Wells Fargo in Downtown Billings*, December 1, 2016).

Cyber Security

Cyberterrorism is the use of information technology by terrorist groups and individuals to further their agenda. This can include use of information technology to organize and execute attacks against networks, computer systems and telecommunications infrastructures, or for exchanging information or making threats electronically. Examples are hacking into computer systems, introducing viruses to vulnerable networks, website defacing, or terroristic threats made via electronic communication.

Public interest in cyberterrorism began in the late 1980s with the widespread use of the internet. As 2000 approached, the fear and uncertainty about the millennium bug heightened, as did the potential for attacks by cyber terrorists. The terrorist attacks on September 11, 2001 and the ensuing "War on Terror" led to further media coverage of the potential threats of cyberterrorism in the years following. The possibility of a large attack making use of computer networks to sabotage critical infrastructure with the aim of putting human lives in jeopardy or causing disruption on a national scale, either directly or by disruption of the national economy, has been a concern for the past decade.

Internet fraud is the use of internet services or software with internet access to defraud victims or to otherwise take advantage of them; for example, stealing personal information that leads to identity theft. A very common form of internet fraud is the distribution of rogue security software. The most widespread internet and email scam today is called phishing, where digital thieves lure you into divulging your password info through convincing emails and web pages. These phishing emails and web pages resemble legitimate credit authorities. They frighten or entice you into visiting a phony web page and entering your ID and password. Commonly, the guise is an urgent need to "confirm your identity". They will even offer you a story of how your account has been attacked by hackers to lure you into entering your confidential information. The email message will require you to click on a link. But instead of leading you to the real login site, the link will redirect you to a fake website where you may innocently enter your ID and password. This information is intercepted by the scammers, who later access your account and extort money.

Ransomware attacks have become more and more frequent. Ransomware is a type of malware that threatens to publish the victim's personal data or perpetually block access to it unless a ransom is paid. It encrypts the

victim's files, making them inaccessible, and demands a ransom payment to decrypt them. Some of the largest ransomware attacks in 2021 were on Colonial Pipeline ($4.4.million), JBS Food the world's largest meatpacker ($11 million), KIA Motors ($20 million), and others.

Senior citizens are also vulnerable to health care scams. Scammers will call as healthcare or Medicare representatives to gain access to their personal or contact information. They will use their contact information to call seniors back at a later date and say they spoke with their daughter, son or other relative and that it's OK to give them social security numbers, driver's license numbers or other personal information.

Con artists are also creating devious schemes to prey on retired persons and their accumulated wealth. Senior citizens are receiving phone calls from scammers who purport to be IRS agents. They claim to be calling about unpaid back taxes and proceed to threaten the senior citizen with arrest, lawsuits, suspension of their driver's license and more. Tax-refund fraud hit $21 billion in 2016. All it takes to file a false return is a name, date of birth, and social security number; the type of information that is commonly taken when health care insurers are hacked.

The State of Montana provides resources for counties to assess terrorism and cyber security risks. The Montana All Threat Intelligence Center (MATIC) collects, stores, analyzes and disseminates information on public safety issues, including suspected offenses, to the law enforcement community and government officials regarding dangerous drugs, fraud, organized crime, terrorism and other criminal activity for the purposes of decision making, and proactive law enforcement while ensuring the rights and privacy of citizens. The State Information Technology Services Division Office of Security Services is responsible for protecting the state's cyber assets and securing the state's cyber services to the citizens of Montana.

Vulnerability and Area of Impact

The origins and targets for terrorism and civil unrest are difficult to predict. Individuals or groups that feel oppressed on any issue can resort to violent acts to inflict harm and damage in an attempt to gain publicity or affect policy. Montana has traditionally attracted activist/extremist individuals and groups because of its low population and large geographic area. Groups active in Montana vary from white supremacists to single issue groups, such as environmental extremists. According to the Southern Poverty Law Center, no hate groups are currently active in Stillwater County.

The effects of civil unrest and violence are typically felt by the population. The greatest risk is to human lives during times of unrest. Looting is commonly found in association with these types of events. Therefore, this hazard places both the population and property at risk. Urban areas and places of public gathering are generally areas of greatest risk.

The vulnerability of local communities to a breach in cyber security is real and presents a serious business risk to government operations. Attacks have the potential to cripple vital government services and damage public infrastructure. All government agencies hold valuable or sensitive material, including citizen records, financial information and procurement data. Therefore, everyone is a target. And in today's highly interconnected world, each agency, no matter how small, is a steppingstone to another. So even a seemingly minor breach can have wide-ranging implications. (Governing Institute, 2017).

Agencies also are under nearly constant assault. Hackers know that state and local governments often lag behind commercial entities in cyber security readiness. Consequently, the number of attackers probing municipal systems for vulnerabilities is exploding; everyone from small-time crooks equipped with black-market ransomware kits, to nation states and organized crime syndicates armed with sophisticated cyber weapons. (Governing Institute, 2017).

Cyber threats are widespread. Small towns and school districts are hit with ransomware that shuts down computer systems until they make a payment. Thieves steal citizen identities and financial information from state agency databases. Water authorities endure surgical strikes that use specialized computer code to destroy water pumps. (Governing Institute, 2017).

Healthcare also faces varied cyber security threats that continue to evolve and become more intricate. This includes but is not limited to insider threats, poorly secured web portals, improper data handling, and under-regulated medical data mining. Medical data is more valuable to attackers than financial data, and it can easily be stolen from vulnerable web portals.

Probability and Magnitude

The probability of terrorism, violence, a cyber breach, or civil unrest in Stillwater County directly is difficult to determine. The county is not considered a specific terrorist target nor is it an area of high risk for civil unrest. As with any area, a shooting by a disgruntled person, employee, or student is always possible. A large-scale attack cannot be ruled out, and therefore, a small probability exists. Of greater probability is a national terrorist incident or cyber-attack that has an indirect effect on Stillwater County through its economy.

The effects of terrorism can vary significantly from loss of life and injuries to property damage and disruptions in services such as electricity, water supply, public transportation, and communications. Cyber terrorism could involve destroying or remotely disrupting government computer networks, critical civilian systems such as financial networks or mass media or using computer networks to take over machines that control traffic lights, power plants or dams. If cyber-terrorists managed to disrupt financial markets or media broadcasts, an attack could undermine confidence and cause panic. Attacks could also involve remotely hijacking control systems, with potentially dire consequences, such as breaching dams, colliding airplanes, or shutting down the power grid.

Many American workers report having been victims of workplace violence each year. Unfortunately, many more cases go unreported. Downstream impacts of workplace violence include workforce retention, physical harm that adds to already taxed health resources, perpetuates/exacerbates community crime, and negatively impacts community perception.

Terrorism and cyberattacks are considered emerging hazards with little to no history in the region but incidents occurring with more frequency across the globe. As such, the probability of a future terrorism or cyber security incident in Stillwater County was rated by the Planning Team as “possible”.

Future Development

Future development should have little to no impact on the terrorism, violence, civil unrest, or cyber threats. Given the goals of eco-terrorists; however, future development could serve as the basis for an event over controversial development.

Unexpected Weather Event

Many academics and national security experts agree that Unexpected Weather Event contributes to an uncertain world where terrorism can thrive. Unexpected Weather Event not only threatens the environment, it can lead to greater instability and fuel global conflict and terrorism. Some of the least stable states in the world will face changing weather patterns that reduce arable land and fresh-water supplies, in turn driving mass-migration, provoking resource conflicts, and fostering global health threats.

Both cyber threats and Unexpected Weather Event are security risks that can affect the safety and security of our most basic resources, such as water, energy and infrastructure, mostly due to a common factor: interconnectedness. As human beings and as nations, we are and always will be directly connected to our

environment, as it provides us with the resources necessary for both survival and prosperity. We have also become intimately connected and dependent on our computer-based technologies, with cyberspace and the Internet being a primary conduit (Allen, 2014).

And just as Unexpected Weather Event can affect our access to (and supply of) water and energy, a cyber-attack on computers and industrial equipment that run water treatment facilities and power plants can have significant negative consequences (Allen, 2014).

4.10 Risk Assessment Summary

This section summarizes the results of the individual risk assessments presented under the hazard profiles. There have been no repetitive loss properties due to flooding in Stillwater County or in the City of Columbus. Neither Stillwater County nor Columbus have had repetitive loss properties associated with other hazards.

Composite Hazard Map and Future Development

Growth policies for Stillwater County (CTA, 2018) and the City of Columbus (2012) were reviewed for potential future development projects. The MHMP Planning Team also weighed in on future development projects that had the potential to be constructed in the next five years. **Figures 10 and 10A** present potential future development projects with the composite of hazard prone areas in Stillwater County and Columbus, respectively. The composite hazard map is an overlay of the impact areas for wildfire, flooding, dam failure, landslide, and hazardous material incidents. **Table 4.10-1** indicates which hazards each of the future development areas are exposed to.

Table 4.10-1. Future Development Summary

Proposed Project	Hazard Areas							
	Wildfire	Severe Summer Weather & Drought	Severe Winter Weather	Flooding & Dam Failure	Landslide	Com. Disease	Haz-Mat & Transp. Accidents	Terrorism, Cyber Security
Columbus I-90 Interchange Travel Plaza	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Park City I-90 Interchange Travel Plaza	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Reed Point I-90 Interchange Travel Plaza	Yes	Yes	Yes	No	No	Yes	Yes	Yes
New I-90 Interchange, Rapelje Road	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Park City Subdivision	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Park City School, southeast end of town	Yes	Yes	Yes	No	No	Yes	No	Yes
Park City Fire Station Expansion	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Columbus Fire Station Expansion	No	Yes	Yes	No	No	Yes	Yes	Yes
Wind Farm, Springtime	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Electrical Substation, outside Park City	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Highway Commercial Development, Park City	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Highway Commercial Development, Columbus	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Highway Commercial Development, Reed Point	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes

Vulnerability Analysis - Loss Estimation Summary

Estimating potential losses and calculating risk requires evaluating where hazard areas and vulnerabilities to them coincide, how frequently the hazards occur, and then estimating the magnitude of damage resulting from

a hazard event. Rather than estimating loss, a vulnerability assessment was completed which estimates building stock exposure. *Section 4.1* presents the methodology for the vulnerability assessment completed for the 2021 MHMP. **Tables 4.10-2 and 4.10-3** present the results of the vulnerability assessment for each hazard for residential and commercial/industrial/agricultural structures, critical facilities, bridges, and population in Stillwater County and Columbus, respectively. **Appendix C-3** contains supporting information.

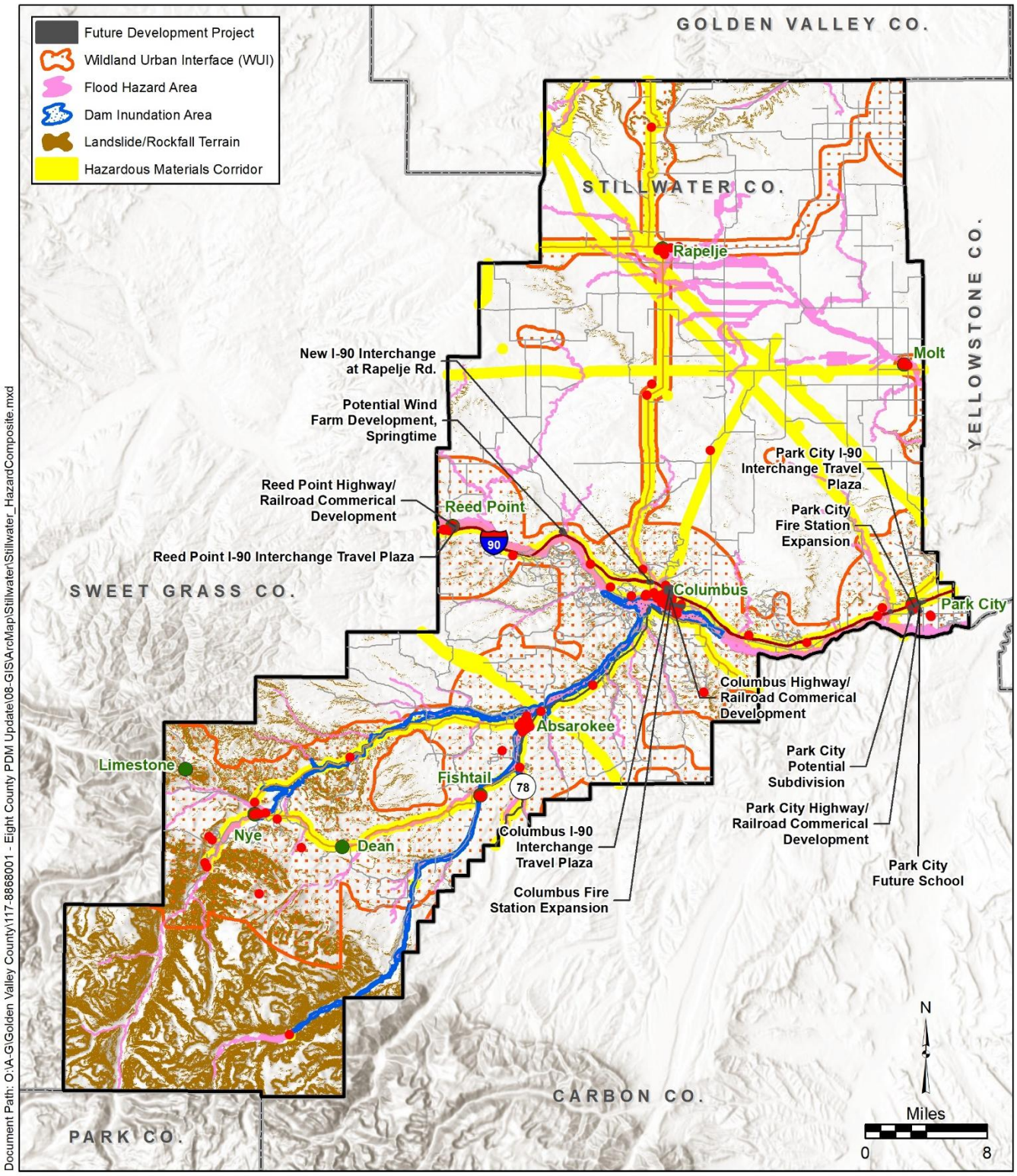


Figure 10
Hazard Composite
Stillwater County, Montana
Multi-Hazard Mitigation Plan

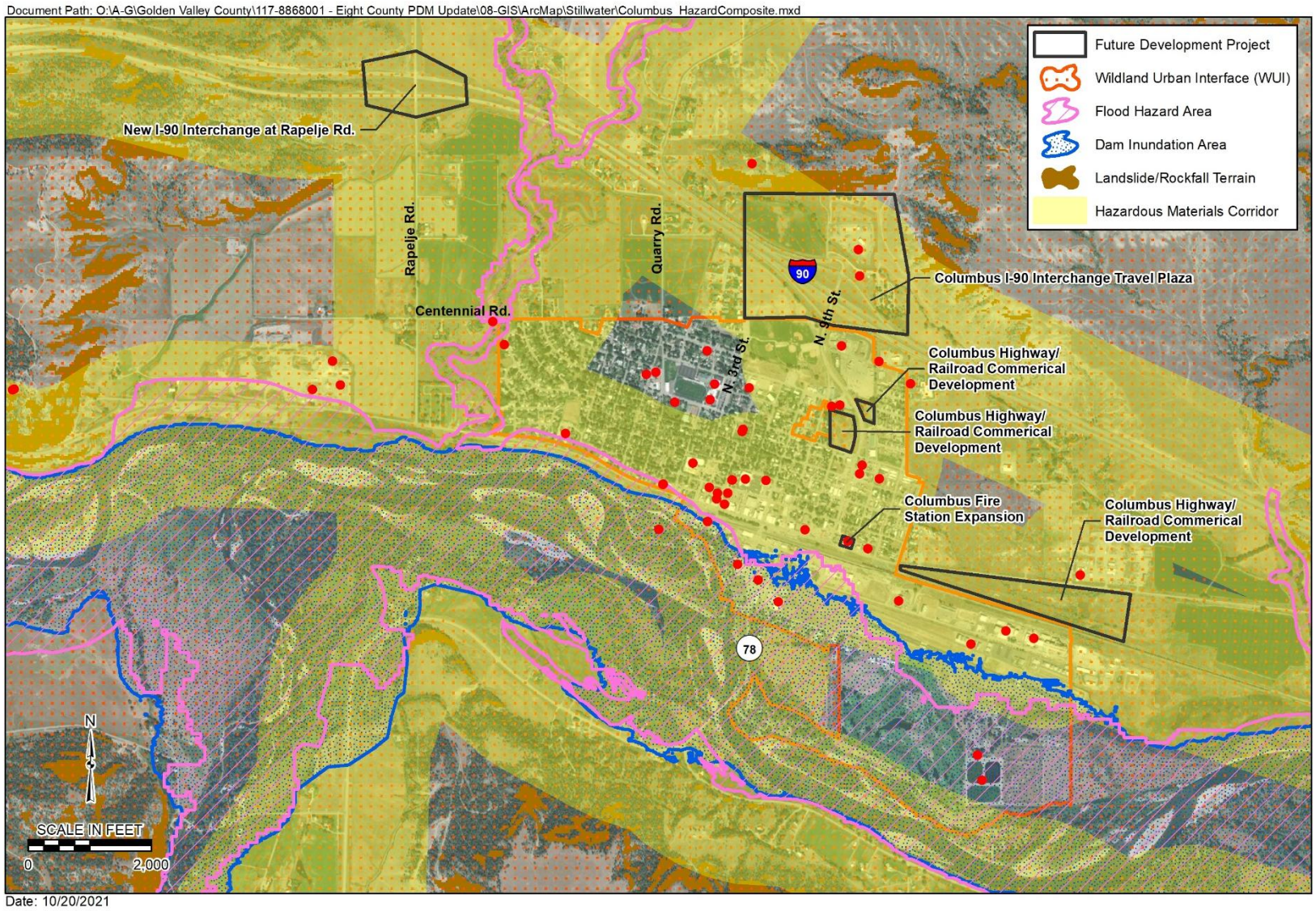


Figure 10A
Hazard Composite - Columbus
Stillwater County, Montana
Multi-Hazard Mitigation Plan

Table 4.10-2. Hazard Vulnerability Summary; Stillwater County (balance)

Hazard	Residential Building Stock - $ Exposure in Hazard Area	# Residential Structures in Hazard Area	Commercial, Industrial & Agricultural Building Stock - $ Exposure in Hazard Area	# Commercial, Industrial & Agricultural Structures in Hazard Area	Critical Facility $ Exposure in Hazard Area	# Critical Facilities Exposure in Hazard Area	Bridge Exposure $	# Bridges in Hazard Area	Persons in Hazard Area	Under 18 in Hazard Area	Over 65 in Hazard Area
Wildfire	$641,512,536	2,862	$125,372,879	558	$86,864,635	109	$67,413,433	100	7,429	1,552	1,750
Severe Summer Weather & Drought	$682,700,434	2,972	$156,107,582	725	$99,629,098	114	$67,901,425	103	8,041	1,680	1,894
Severe Winter Weather	$682,700,434	2,972	$156,107,582	725	$99,629,098	114	$67,901,425	103	8,041	1,680	1,894
Flooding	$87,005,658	414	$26,572,135	107	$2,106,893	12	$43,817,874	55	1,134	237	267
Dam Failure	$123,393,808	693	$26,172,823	113	$21,488,541	17	$11,931,252	19	1,690	353	398
Landslide	$4,728,632	20	$1,122,370	3	$0	0	$620,000	1	52	11	12
Communicable Disease	$682,700,434	2,972	$156,107,582	725	$99,629,098	114	$67,901,425	103	8,041	1,680	1,894
Hazardous Material Incidents & Transportation Accidents	$147,742,173	789	$31,988,386	129	$22,206,376	20	$18,367,558	24	1,933	404	455
Terrorism, Violence, Civil Unrest & Cyber Security	$682,700,434	2,972	$156,107,582	725	$99,629,098	114	$67,901,425	103	8,041	1,680	1,894

Table 4.10-3. Hazard Vulnerability Summary; City of Columbus

Hazard	Residential Building Stock - $ Exposure in Hazard Area	# Residential Structures in Hazard Area	Commercial, Industrial & Agricultural Building Stock - $ Exposure in Hazard Area	# Commercial, Industrial & Agricultural Structures in Hazard Area	Critical Facility $ Exposure in Hazard Area	# Critical Facilities Exposure in Hazard Area	Bridge Exposure $	# Bridges in Hazard Area	Persons in Hazard Area	Under 18 in Hazard Area	Over 65 in Hazard Area
Wildfire	$4,389,830	17	$40,915	1	$8,735,945	2	$0	0	38	8	9
Severe Summer Weather & Drought	$99,696,159	714	$58,257,075	91	$124,487,822	43	$0	0	1,606	335	378
Severe Winter Weather	$99,696,159	714	$58,257,075	91	$124,487,822	43	$0	0	1,606	335	378
Flooding	$5,281,973	37	$5,699,927	11	$5,527,604	8	$0	0	83	17	20
Dam Failure	$3,702,475	29	$4,830,190	6	$4,923,539	6	$0	0	65	14	15
Landslide	$0	0	$0	0	$0	0	$0	0	0	0	0
Communicable Disease	$99,696,159	714	$58,257,075	91	$124,487,822	43	$0	0	1,606	335	378
Hazardous Material Incidents & Transportation Accidents	$83,347,354	590	$57,934,176	89	$80,941,240	34	$0	0	1,327	277	313
Terrorism, Violence, Civil Unrest & Cyber Security	$99,696,159	714	$58,257,075	91	$124,487,822	43	$0	0	1,606	335	378

SECTION 5. MITIGATION STRATEGIES

This section presents mitigation actions for Stillwater County and the City of Columbus to reduce potential exposure and losses from natural, man-made, and technological hazards. The MHMP Planning Team reviewed the Risk Assessment and Vulnerability Analysis to identify and develop the mitigation actions comprising the Stillwater County mitigation strategy.

This section includes:

1. Background and Past Mitigation Accomplishments
2. General Mitigation Planning Approach
3. Mitigation Goals and Objectives
4. Capability Assessment
5. Mitigation Strategy Development

Hazard mitigation reduces the potential impacts of, and costs associated with, emergency and disaster-related events. Mitigation actions address a range of impacts, including impacts on the population, property, the economy, and the environment.
Mitigation actions can include activities such as: revisions to land-use planning, training and education, and structural and nonstructural safety measures.

5.1 Background and Past Mitigation Accomplishments

In accordance with DMA 2000 requirements, a discussion regarding past mitigation activities and an overview of past efforts is provided as a foundation for understanding the mitigation goals, objectives, and activities outlined in this Plan. Stillwater County, through previous and ongoing hazard mitigation activities, has demonstrated that it is pro-active in protecting its physical assets and citizens against losses from natural hazards. Completed and ongoing projects since the 2015 PDM Plan was adopted include the following:

Wildfire

- Fire information is posted on the Stillwater County website as well as the County DES and Columbus Facebook pages to inform the public.
- Fire departments in Stillwater County meet with subdivision homeowner associations annually and in one-on-one meetings with landowners at community events to discuss defensible space.
- Coordination has taken place with a Regional Fire Prevention group to ensure consistent messaging during the fire season.
- Stillwater County pushes out Red Flag Warnings across their Emergency Alert System.
- BLM Community Assistance money has been used to offer landowners a cost-share program for fuel reduction around structures.
- Partner agencies continue to do fuel reduction in the county. The U.S. Forest Service has done a lot of burning and thinning around the Stillwater Mine and at the subdivision next to the mine they have done thinning above and between houses. Thinning and burning has been done around the Benbow Mine portal and around a nearby subdivision. The BLM has worked on fuel reduction on their land adjacent to sections of state land. The Beartooth Ranch did significant fuel treatments above the Stillwater River in collaboration with the Rocky Mountain Elk Foundation. Fuel reduction projects were completed on state ground around Huntley Butte and in the Countryman Creek area. The Stillwater County Road Department has mitigated fuel along most of the county road corridors.
- Stillwater County has completed between 100-150 fuel assessments for landowners over the past 10 years.
- When fuel reduction projects are completed, Stillwater County GIS adds them to a digital GIS layer to document the work that is getting done.
- Stillwater County updated its CWPP in 2021.

Severe Summer Weather and Drought

- Stillwater County and the City of Columbus maintain trees that could impact their property. The county has a contractor do right-of-way clearing. Columbus monitors trees and has implemented recommendations on cutting and trimming in accordance with their Tree Maintenance Ordinance. Columbus conducted a major inventory and assessment of trees in Upper Itch-Kep-Pe Park in 2015-16.
- Stillwater County works with the local media to broadcast weather warnings over their Emergency Alert System. They also use social media to get NWS alerts out before the event.
- Pamphlets on preparing for severe weather are available to the public at the DES office.
- Stillwater County has held weather spotter training consistently every other year.
- The Stillwater County Extension office has completed a weather station and sensor as means to provide range and agriculture management tools to local producers.

Flooding

- Stillwater County's Floodplain Program provides continued compliance with the NFIP. The program won recognition at the annual Floodplain Administrator's Conference for most improved program. Applications are being processed in a more professional manner, outreach and public education have improved, and violations have been identified. There is interest in joining the CRS and the county's new Community Development program will assist with compliance deliverables.
- All major bridges have been updated and culverts have been upsized. A FEMA grant provided funding to upgrade several flood prone roads over past few years.
- The City of Columbus completed several drainage projects including installing drainage under old Highway 10 at "A" Street and "B" Street, and new drainage facilities on railroad property. This project was completed to provide future drainage facilities north to 3rd or 4th Ave. on "A" and "B" streets. Also, as part of the Elementary School project, the City installed a new drainage system from 1st Ave. N. to 2nd Ave. N. on 3rd St.
- MDT placed rip-rap at the bridge along the Yellowstone River at Itch-Kep-Pe Park where the north abutment had eroded due to flooding.
- New floodplain maps are being developed Stillwater County. The LiDAR flight of the Stillwater River for elevations of the surface and bottom of the channel has been completed and surveying to tie in points is underway.

Landslide

- Stillwater County secured an Economic Development Administration (EDA) grant to repair road damage associated with landslide of the W. Rosebud and Fiddler Creek roads.

Communicable Disease

- Stillwater-Billings Clinic continues to prevent and control communicable disease by surveillance and risk-based inspections of food service establishments.
- Education and training are provided for staff and key partners in the medical community on disease awareness and prevention.
- Public outreach and education are regularly provided on preventing communicable disease.

Terrorism, Violence, Civil Unrest

- Stillwater County receives daily updates from Montana's All-Threat Information Center regarding large events that are being planning in the county.
- Stillwater County has had active shooter exercises; however, not in the past three years.

All Hazards

- Stillwater County updated their Growth Policy in 2018.

- Stillwater County obtained a portable propane generator and wiring was installed at one of the emergency shelters. They are also purchasing a generator for the Absarokee repeater. Currently, there are generators at the courthouse and Columbus Fire Station.
- Code Red and IPAWS have been implemented in the county for emergency notification.

5.2 General Mitigation Planning Approach

The overall approach used to update the Stillwater County mitigation strategy was based on FEMA guidance regarding local mitigation plan development, including:

- DMA 2000 regulations, specifically 44 CFR 201.6 (local mitigation planning)
- FEMA "Local Mitigation Planning Handbook", March 2013
- FEMA "Integrating Hazard Mitigation into Local Planning", March 2013
- Identifying Mitigation Actions and Implementing Strategies (FEMA 386-3)
- FEMA "Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards", January 2013

The mitigation strategy approach includes the following steps that are further detailed in later sections of this Plan:

- Review and update mitigation goals and objectives.
- Identify mitigation capabilities and evaluate their capacity and effectiveness to mitigate and manage hazard risk.
- Identify past and ongoing mitigation activities throughout the county.
- Identify appropriate county and local mitigation strategies to address the regions risk to natural and man-made hazards.
- Prepare an implementation strategy, including the prioritization of projects in the mitigation strategy.

5.3 Mitigation Goals and Objectives

This section documents the efforts to develop hazard mitigation goals and objectives established to reduce or avoid long-term vulnerabilities to the identified hazards.

According to CFR 201.6(c)(3)(i): "The hazard mitigation strategy shall include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards." For the purposes of this plan, goals are defined as follows:

Goals are general guidelines that explain what is to be achieved. They are usually broad, long-term, policy-type statements and represent global visions. Goals help define the benefits that the plan is trying to achieve. The success of the plan, once implemented, should be measured by the degree to which its goals have been met (that is, by the actual benefits in terms of hazard mitigation).

The 2015 Stillwater County PDM Plan had three goals; one was specific to wildfire, and the other two were All Hazard goals, as follows:

- Goal 1: Reduce population and property losses through comprehensive mitigation programs.
- Goal 2: Protect the public, firefighters, communities, and property from losses due to wildfire.
- Goal 3: Utilize hazard-specific strategies to reduce future losses from particular hazards.

The methodology for the 2021 MHMP update was to establish a goal for each hazard, as prioritized by the MHMP Planning Team, followed by an All Hazard goal.

FEMA defines Objectives as strategies or implementation steps to attain mitigation goals. Unlike goals, objectives are specific and measurable, where feasible. Objectives for the 2021 Stillwater County MHMP were consistent with FEMA's "*Local Mitigation Planning Handbook, March 2013*" guidelines (see *Section 5.5.1*) as either: Public Education and Awareness, Property Protection, Prevention, Structural, Natural Resource Protection, or Emergency Services, with an objective added for Planning/Analysis/Mapping projects. Goals and objectives for the 2021 MHMP are presented in **Table 5.3-1**.

Table 5.3-1. Summary of Goals and Objectives

Goal #	Goal Statement	Objective #	2021 Goal/Objective Statement
1	Reduce Impacts from Wildfire	1.1	Implement Public Education and Awareness Projects to Reduce Impacts from Wildfire
		1.2	Implement Prevention Projects to Reduce Impacts from Wildfire
		1.3	Implement Property Protections Projects to Reduce Impacts from Wildfire
		1.4	Implement Mapping, Planning, and Analysis Projects to Reduce Impacts from Wildfire
		1.5	Enhance Emergency Service Capabilities by Implementing Projects to Reduce Impacts from Wildfire
2	Reduce Impacts from Severe Summer Weather and Drought	2.1	Implement Property Protection Projects to Reduce Impacts from Severe Summer Weather and Drought
		2.2	Implement Public Education and Awareness Projects to Reduce Impacts from Severe Summer Weather and Drought
3	Reduce Impacts from Severe Winter Weather	3.1	Implement Public Education and Awareness Projects to Reduce Impacts from Severe Winter Weather
		3.2	Implement Property Protection Projects to Reduce Impacts from Severe Winter Weather
		3.3	Implement Planning, Analysis, and Mapping Projects to Reduce Impacts from Severe Winter Weather
4	Reduce Impacts from Flooding and Dam Failure	4.1	Implement Prevention Projects to Reduce Impacts from Flooding and Dam Failure
		4.2	Implement Structural Projects to Reduce Impacts from Flooding and Dam Failure
		4.3	Implement Public Education and Awareness Projects to Reduce Impacts from Flooding and Dam Failure
		4.4	Implement Planning, Analysis and Mapping Projects to Reduce Impacts from Flooding and Dam Failure
5	Reduce Impacts from Landslides	5.1	Implement Mapping, Analysis, and Planning Projects to Reduce Impacts from Landslide
		5.2	Implement Structural Projects to Reduce Impacts from Landslides
6	Reduce Impacts from Communicable Disease	6.1	Implement Prevention Projects to Reduce Impacts from Communicable Disease
		6.2	Implement Public Education and Awareness Projects to Reduce Impacts from Communicable Disease
		6.3	Enhance Emergency Service Capabilities to Reduce Impacts from Communicable Disease
		6.4	Implement Planning, Analysis & Mapping Projects to Reduce Impacts from Communicable Disease
7	Reduce Impacts from Hazardous Material Incidents & Transportation Accidents	7.1	Enhance Emergency Service Capabilities to Reduce Impacts from Hazardous Material Incidents & Transportation Accidents
		7.2	Implement Planning, Analysis & Mapping Projects to Reduce Impacts from Hazardous Material Incidents & Transportation Accidents
8	Reduce Impacts from Terrorism, Civil Unrest, Violence, Civil Unrest, and Cyber Security	8.1	Enhance Emergency Service Capabilities to Reduce Impacts from Terrorism, Civil Unrest, Violence, and Cyber Security.
		8.2	Implement Planning, Analysis & Mapping Projects to Reduce Impacts from Terrorism, Civil Unrest, Violence, and Cyber Security
		8.3	Implement Public Education & Awareness Projects to Reduce Impacts from Terrorism, Civil Unrest, Violence, and Cyber Security
9	Reduce Impacts from All Hazards	9.1	Implement Prevention Projects to Reduce Impacts from All Hazards
		9.2	Enhance Emergency Service Capabilities to Reduce Impacts from All Hazards

Table 5.3-1. Summary of Goals and Objectives

Goal #	Goal Statement	Objective #	2021 Goal/Objective Statement
		9.3	Implement Public Education and Awareness Projects to Reduce Impacts from All Hazards
		9.4	Implement Planning, Analysis & Mapping Projects to Reduce Impacts from All Hazards

5.4 Capability Assessment

Goals and objectives used to mitigate natural and technological hazards build on the community's existing capabilities. Stillwater County's capabilities to support and implement mitigation projects include the programs and resources of various local, regional, state, and federal partners and the administrative and technical capabilities of county and city staff who implement the legal and regulatory requirements used to manage growth (zoning, building codes, subdivision regulations, and floodplain ordinances).

It is recognized that there are many organizations with responsibilities and resources that will coordinate and aid Stillwater County with mitigation and emergency response. Many of those contacts and resources have provided help in the past and through this plan and its implementation will be identified for further integration. Those contacts and organizations include:

- U.S. Dept. of Homeland Security - FEMA
- U.S. Environmental Protection Agency, Region 8
- U.S. Geological Survey
- U.S. Bureau of Reclamation
- U.S. Fish and Wildlife Service
- U.S. Forest Service
- Bureau of Land Management
- National Weather Service, Billings Station
- Montana Bureau of Mines and Geology
- Montana Disaster and Emergency Services
- Montana Dept. of Environmental Quality
- Montana Dept. of Justice, All Threat Intelligence Center
- Montana Dept. of Natural Resources and Conservation
- Montana Dept. of Public Health and Human Services
- Montana Dept. of Transportation
- Private Businesses

These agencies have provided key funding, emergency response, and/or technical assistance in dealing with various hazard events in order to develop further capabilities. Stillwater County will work towards establishing mitigation actions and emergency services through inter-governmental agreements, memorandums of understandings/agreements and other formal relationships to produce a higher level of cooperation and coordination between government and organizations for the benefit of the health and safety of their citizens and property protection.

Stillwater County's hazard mitigation capabilities are summarized below. These resources have the responsibility to provide overview of past, current, and ongoing pre- and post-disaster mitigation projects including capital improvement programs, wildfire mitigation programs, stormwater management programs, and NFIP compliance projects. The fiscal capabilities of the Stillwater County and Columbus to support hazard mitigation and provide the funding to implement the mitigation strategy outlined in the MHMP.

5.4.1 Summary of Programs and Resources Available to Support Mitigation

Several FEMA programs support mitigation efforts in Stillwater County, as described below.

National Flood Insurance Program

The NFIP is aimed at reducing the impact of flooding on private and public structures. This is achieved by providing affordable insurance for property owners and by encouraging communities to adopt and enforce floodplain management regulations. These efforts help mitigate the effects of flooding on new and improved structures. Overall, the program reduces the socio-economic impact of disasters by promoting the purchase and retention of Risk Insurance in general, and NFIP in particular.

NFIP Community Rating System

As an additional component of the NFIP, the Community Rating System is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote the awareness of flood insurance. Stillwater County does not currently participate in the CRS program.

5.4.2 Administrative and Technical Capabilities

Stillwater County's administrative and technical capabilities to implement mitigation projects include emergency managers, planners, community development specialists, floodplain managers, in-house GIS personnel, contract engineers, and financial, legal and regulatory requirements. Expertise from local and regional planning partners also contribute to mitigation capabilities for Stillwater County and the City of Columbus. **Table 5.4-1** summarizes capabilities of the jurisdictions adopting this MHMP to accomplish hazard mitigation. *Section 3.7* provides additional discussion on many of these policies.

Table 5.4-1. Capability Assessment Summary

Capability	Stillwater County	City of Columbus
Population	9,960 (2021)	2,049 (2018)
Policies and Programs		
Growth Policy that Supports Hazard Mitigation	Yes - 2018	Yes – Currently being updated
Subdivision Regulations that Support Hazard Mitigation	Yes - County Planning Board	Yes - City-County Planning Board
Zoning that Recognizes Hazard Areas	Not yet. Discussing developmental regulation (zoning). Second draft. Doesn't call out hazard areas.	Yes
National Flood Insurance Program Participation	Yes	Yes
Local Building Codes	No – Uses State codes	No – Uses State codes
Technical Capabilities		
Emergency Manager	Yes	No – Uses county DES
Public Works Engineer	On-call engineering contractors	On-call engineering contractors
GIS Mapping Capabilities	Yes	No
Floodplain Administrator	Yes	Yes
Community Planners	Yes	No - Uses county services. Contracted planning.

Stillwater County Disaster and Emergency Services

The mission of Stillwater County DES is to save lives, prevent injury, and protect property and the environment by taking reasonable and affordable measures to mitigate, prepare for, respond to and recover from disasters. The Stillwater County DES Coordinator is responsible for the planning, coordination, and implementation of all emergency management and Homeland Security related activities for the county. Other responsibilities include coordination of activities for the county's Emergency Operations Center (EOC). The EOC, when activated, is a central location where representatives of local government and private sector agencies convene during disaster situations to make decisions, set priorities and coordinate resources for response and recovery. These efforts are designed to enhance the capacity of the local government to plan for, respond to, and mitigate the consequences of threats and disasters using an all-hazard framework.

The Stillwater County DES office includes two staff positions; a full-time DES Coordinator who devotes 100 percent of their time to emergency management, and a 16 hour/week deputy DES Coordinator. Both positions are funded 50 percent federal through the Emergency Management Performance Grant (EMPG) program and 50 percent through the county general fund.

Local Emergency Planning Committee

The mission of the Stillwater County LEPC is to provide resources and guidance to the community through education, coordination and assistance in hazmat planning; and to assure public health and safety. They do not function in actual emergency situations, but attempt to identify and catalogue potential hazards, identify available resources, and mitigate hazards when feasible. The LEPC consists of representatives from businesses, local government, emergency responders and citizen groups located in Stillwater County. Monthly meetings are held the first Wednesday of every month. Twenty (20) people typically attend these meetings.

City-County Planning Board

The role of the Stillwater County City-County Planning Board is to serve in an advisory capacity to the local governing bodies. The Planning Board may propose policies for subdivision plats; the development of public ways, public places, public structures, and public and private utilities; the issuance of improvement location permits on platted and unplatted lands; or the laying out and development of public ways and services to platted and unplatted lands. The Planning Board is involved in all matters pertaining to the approval or disapproval of plats or subdivisions. The Planning Board acts as the Columbus Zoning Commission. It is also the Planning Board's responsibility to prepare a growth policy for the county.

Stillwater County Fire Protection Services

Fire protection in Stillwater County is handled through a combination of rural fire districts and fire departments. At this time, all the departments and districts operate with paid and volunteer firefighters. The Commission appoints a County Fire Warden and cooperates with federal and state fire protection agencies. In Stillwater County, there are four rural fire districts, including Absarokee, Broadview, Columbus, and Park City. The Broadview district includes an area in the four counties of Stillwater, Yellowstone, Golden Valley, and Musselshell. In addition, there are seven volunteer fire departments: Absarokee, Broadview, Columbus Rural, Molt, Park City, Rapelje, and Nye.

The Stillwater County Fire Council was formed to save lives, prevent injury, and protect property and the environment by taking reasonable and affordable measures to mitigate, prepare for, respond to and recover from disasters. The Fire Chief or a representative from each department meet for rural fire council meetings as needed, but at least quarterly. Written mutual aid agreements have been signed among and between all

fire districts or departments in the county, as well as with Sweet Grass and Carbon Counties, and similar agreements have been reached with state and federal fire control agencies. The departments within the county also participate in the state mutual aid program and have mutual aid agreements with the U.S. Forest Service and BLM to provide fire protection to the county fire departments for naturally caused fires threatening federal lands that start on private land within the county.

Beartooth Resource Conservation and Development (RC&D) District

The Beartooth RC&D started as a conservation district in 1971, was incorporated in 1990 and became an economic development district in 1995. A 22-member Board of Directors, that represents local government and conservation districts, governs it. The district covers a five-county region consisting of Yellowstone, Big Horn, Stillwater, Carbon and Sweetgrass counties. Pursuing its economic development functions, the district has assisted primarily the smaller towns and counties in their region with obtaining grants and loans that support business development and employment, technical assistance and training.

The district's economic development goals include: assisting in the development of infrastructure to enhance the quality of life of people in the area and support future development; strengthening and solidifying the regional economy by supporting local industries to improve the quality of life and providing employment opportunities; developing a regional forum for communication between communities and regional groups; improving the standard of living by upgrading community services and their facilities; and, assisting local conservation groups in maintaining the natural resource base.

Montana DES Eastern District Field Officer

Montana DES District Field Officer acts on behalf of Montana DES and is primarily responsible for assisting local and tribal governments with the development of their emergency management programs and mitigation planning. District field officers are the main conduit for implementation of various emergency management initiatives affecting local and tribal government and coordinating with other cooperators.

Montana DNRC – Floodplain Management, Dam Safety, Wildfire Preparedness

The Montana DNRC Floodplain Management Program promotes common sense planning for development in flood prone areas through education for the benefit of public health, safety, and welfare. The Dam Safety Program regulated the construction, operations and maintenance of Montana's dams to protect life and property from damages due to failure. The dam safety program also provides training and outreach to dam owners and engineers, and assists with emergency preparedness activities.

The Forestry Division, of the Montana DNRC is responsible for planning and implementing forestry and fire management programs through an extensive network of staff located in field offices across the State. The Fire and Aviation Management Bureau provides resources, leadership and coordination to Montana's wildland fire services to protect lives, property, and natural resources; working with local, tribal, state, and federal partners to ensure wildfire protection on all state and private land in Montana. There are numerous programs aimed at effective fire preparedness and capacity building. The Fire Preparedness effort is focused in four areas:

- Fire Prevention Program seeks to educate Montanans about fire risk, the wildland urban interface and reducing human-caused fires;
- Fire Training Program provides statewide training opportunities for DNRC and local government personnel;
- Equipment Development Center builds and maintains wildland fire equipment and radio communications;

- Fire Support Programs provide financial and technical expertise to assist all fire programs in meeting their respective goals and mandates. These include, but are not limited to: Fire Assessment fees, GIS, repair and maintenance of radio systems and rolling stock equipment.

U.S. Forest Service and BLM

The U.S. Forest Service, Custer-Gallatin National Forest and BLM Montana/Dakota District Office are involved in planning activities for public land within Stillwater County. The Forest Service and BLM manage fuel reduction projects on public land in southern Stillwater County and are responsible for wildfire suppression on their lands.

Stillwater-Billings Clinic and Montana DPHHS

Stillwater-Billings Clinic is an essential provider of personal and public health services in Stillwater County. Services include immunizations, family planning, and communicable disease prevention, investigation and follow up, and public health emergency preparedness. The county's public and environmental health programs are supported by the Montana Department of Public Health and Human Services whose mission is to improve and protect the health of Montanans to the highest possible level with objectives to prevent and control communicable disease, and to prepare the public health system to respond to public health events and emergencies. The Public Health and Safety Division continuously monitors the proportion of children fully immunized and the number of local jurisdictions that participate in a public health emergency exercise every other year as measurement in achieving this goal.

Montana Governor's Drought and Water Supply Advisory Committee

The Montana Drought and Water Supply Advisory Committee serves as a clearinghouse for the sharing of water supply and moisture conditions on a monthly basis among state and local agency officials with responsibility to manage natural resources and support constituents most likely affected by drought. In its monthly assessment of conditions, the committee considers various scientific indicators that quantify and forecast precipitation, mountain snowpack, streamflow, soil moisture, reservoir contents, and agricultural and livestock production. The committee also provides planning support and information sharing with watershed groups and county drought committees through this website and staff contact.

Member agencies include the Governor's Office, DNRC, DEQ, Fish Wildlife and Parks, Agriculture, Livestock, Commerce, and DES. Federal reporting partners include the Bureau of Reclamation, U.S. Geological Survey, Natural Resource Conservation Service, Agricultural Statistics Service, and the National Weather Service. Other reporters include the multi-agency Northern Rockies Coordination Center for fire conditions, Montana Tech's Groundwater Information Center, Montana Climate Office, USDA Farm Service Agency, U.S. Congressional delegation representatives, U.S. Small Business Administration, Rural Development, and Montana State University Extension Service.

Montana All Treat Intelligence Center

The State of Montana provides resources for counties to assess terrorism and cyber security risks. The Montana All Threat Intelligence Center (MATIC) collects, stores, analyzes and disseminates information on public safety issues, including suspected offenses, to the law enforcement community and government officials regarding dangerous drugs, fraud, organized crime, terrorism and other criminal activity for the purposes of decision making, and proactive law enforcement while ensuring the rights and privacy of citizens. The State Information Technology Services Division Office of Security Services is responsible for protecting the state's cyber assets and securing the state's cyber services to the citizens of Montana.

Homeland Security

The U.S. Department of Homeland Security (DHS) can also provide expertise and/or funding to assist Stillwater County with aspects of their mitigation strategy. DHS leverages resources within federal, state, and local governments, coordinating the transition of multiple agencies and programs into a single, integrated agency focused on protecting the American people and their homeland. More than 87,000 different governmental jurisdictions at the federal, tribal, state, and local level have homeland security responsibilities. FEMA is an agency within the DHS. Stillwater County may solicit grant funding from DHS to strengthen their emergency services and hazard mitigation program.

NOAA Weather-Ready Nation Program

The Weather-Ready Nation (WRN) Ambassador initiative is NOAA's effort to formally recognize NOAA partners who are improving the nation's readiness, responsiveness, and overall resilience against extreme weather, water, and climate events. As a WRN Ambassador, partners commit to working with NOAA and other Ambassadors to strengthen national resilience against extreme weather. In effect, the WRN Ambassador initiative helps unify the efforts across government, non-profits, academia, and private industry toward making the nation more ready, responsive, and resilient against extreme environmental hazards. WRN is a strategic outcome where society's response should be equal to the risk from all extreme weather, water, and climate hazards.

5.4.3 Fiscal Capabilities

Mitigation projects and initiatives are largely or entirely dependent on available funding. Stillwater County is able to fund mitigation projects though existing local budgets, local appropriations (including referendums and bonding), and through a myriad of Federal and State loan and grant programs. A number of these funding opportunities are described below.

FEMA Hazard Mitigation Funding Opportunities

Federal mitigation grant funding is available to all communities with a current hazard mitigation plan (this plan); however, most of these grants require a "local share" in the range of 10-25 percent of the total grant amount. The FEMA mitigation grant programs are described below.

Hazard Mitigation Grant Program (HMGP). The HMGP is a post-disaster mitigation program. It is made available to states by FEMA after each Federal disaster declaration. The HMGP can provide up to 75 percent funding for hazard mitigation measures. The HMGP can be used to fund cost-effective projects that will protect public or private property in an area covered by a federal disaster declaration or that will reduce the likely damage from future disasters. Examples of projects include acquisition and demolition of structures in hazard prone areas, flood-proofing or elevation to reduce future damage, minor structural improvements and development of state or local standards. Applicants who are eligible for the HMGP are state and local governments, certain nonprofit organizations or institutions that perform essential government services, and Indian tribes and authorized tribal organizations.

Individuals or homeowners cannot apply directly for the HMGP; a local government must apply on their behalf. Applications are submitted to your state and placed in rank order for available funding and submitted to FEMA for final approval. Eligible projects not selected for funding are placed in an inactive status and may be considered as additional HMGP funding becomes available. More information: https://www.fema.gov/hazard-mitigation-grant-program

FEMA, Public Assistance (PA) with 406 Mitigation. Public Assistance is a post-disaster reimbursement program that provides federal funding to help communities respond to and recover from disasters. FEMA reimburses state and local governments and certain types of private nonprofit organizations for the cost of disaster-related debris removal, emergency protective measures to protect life and property, and permanent repair work to damaged or destroyed infrastructure. Section 406 mitigation measures are funded under the PA, or Infrastructure, program. The 406 funding provides discretionary authority to fund mitigation measures in conjunction with the repair of the disaster-damaged facilities, so is limited to declared jurisdictions and eligible damaged facilities. The PA Program is a 75% federal / 25% non-federal reimbursement program – the non-federal share cannot be matched with other federal funding.

Building Resilient Infrastructure and Communities (BRIC) Grant Program. The BRIC program supports states, local communities, tribes and territories as they undertake hazard mitigation projects, reducing the risks they face from disasters and natural hazards. BRIC is a new FEMA pre-disaster hazard mitigation program that replaces the former PDM program. The BRIC program guiding principles are supporting communities through capability- and capacity-building; encouraging and enabling innovation; promoting partnerships; enabling large projects; maintaining flexibility; and providing consistency. More information: https://www.fema.gov/grants/mitigation/building-resilient-infrastructure- communities

Rehabilitation of High Hazard Potential Dams Grant Program. This program provides technical, planning, design, and construction assistance in the form of grants for rehabilitation of eligible high hazard potential dams. More information: https://www.fema.gov/emergency-managers/risk-management/dam-safety/grants#hhpd

Flood Mitigation Assistance (FMA) Grant Program. FMA provides funding to assist states and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the NFIP. The FMA is funded annually; no federal disaster declaration is required. Only NFIP insured homes and businesses are eligible for mitigation in this program. Funding for FMA is very limited and, as with the HMGP, individuals cannot apply directly for the program. Applications must come from local governments or other eligible organizations. The federal cost share for an FMA project is 75 percent. At least 25 percent of the total eligible costs must be provided by a non-federal source. Of this 25 percent, no more than half can be provided as in-kind contributions from third parties. FMA funds are distributed from FEMA to the state. More information: https://www.fema.gov/flood-mitigation-assistance-grant-program

Fire Management Assistance Grant (FMAG) Program. The FMAG program provides grants to states, tribal governments and local governments for the mitigation, management and control of any fire burning on publicly (non-federal) or privately owned forest or grassland that threatens such destruction as would constitute a major disaster. The grants are made in the form of cost sharing with the federal share being 75 percent of total eligible costs. Grant approvals are made within 1 to 72 hours from time of request. More information: http://www.fema.gov/fire-management-assistance-grant-program

Fire Prevention and Safety (FP&S) Grants. FP&S Grants support projects that enhance the safety of the public and firefighters from fire and related hazards. The primary goal is to target high-risk populations and reduce injury and prevent death. Eligibility includes fire departments, national, regional, state, and local organizations, Native American tribal organizations, and/or community organizations recognized for their experience and expertise in fire prevention and safety programs and activities. Private non- profit and public organizations are also eligible. Interested applicants are advised to check the website periodically for announcements of grant availability: https://www.fema.gov/welcome-assistance- firefighters-grant-program

Other Mitigation Funding Opportunities

Grant funding is available from a variety of federal and state agencies for training, equipment, and hazard mitigation activities. Several of these programs are described below.

U.S. Army Corps of Engineers (USACE) Section 205 Program. Section 205 of the Flood Control Act of 1948, as amended, provides authority for the USACE to construct projects (either structural or nonstructural) to reduce damages caused by flooding. This authority focuses on solving local flood problems in urban areas, towns and communities. Under the Section 205 Program, the USACE can provide for local protection from flooding by the construction or improvement of flood control works. The types of studies and/or projects, which are tailored to be site specific, are either structural or nonstructural. Structural projects include levees, channel improvements, small dams and floodwalls. Nonstructural measures reduce flood damages by changing the use of floodplains or by accommodating existing uses to the flood hazard. Examples include flood proofing, relocation of structures, and flood warning and preparedness systems. The USACE oversees planning, design, and construction of flood risk management projects in close coordination with the project sponsor. Before the federal government can participate in implementing a Section 205 project, a planning study must be conducted to determine if the project is economically justified (benefits exceed the costs), technically feasible, and environmentally acceptable.

The feasibility study is initially 100 percent federally-funded up to $100,000. Any study costs over $100,000 are cost shared 50-50 between the USACE and the local sponsor. The sponsor's 50 percent can consist of any combination of cash and in-kind services. Once the feasibility study is complete, the remaining project cost is shared 65 percent federal and 35 percent non-federal. The sponsor's 35 percent share (minimum 5 percent cash) of the total project implementation cost consists of cash and Lands, Easements, Rights-of-way, Relocations, and Disposal areas (LERRDs) necessary for project construction. If the value of the LERRDs plus the minimum 5 percent cash contribution does not equal or exceed 35 percent of the project cost, the sponsor must pay the additional amount necessary so that the sponsor's total contribution equals 35 percent of the project cost. The federal investment in the solution is limited to a maximum of $10 million per project.

USACE Section 22 Program. Section 22 of the Water Resources Development Act of 1974, as amended, provides authority for the USACE to assist states, local governments, federally-recognized Indian Tribes and other non-federal entities in the preparation of comprehensive plans for the development, utilization and conservation of water and related land resources. Under the Section 22 Program, the USACE can provide technical planning assistance in all areas related to water resources development. Typical studies are only planning level of detail; they do not include detailed design for project construction. The studies generally involve the analysis of existing data for planning purposes using standard engineering techniques, although some data collection is often necessary. Most studies become the basis for state, tribal, or local planning decisions. The program can encompass many types of studies dealing with water resource issues including: flood damage reduction studies, bank stabilization studies, water quality studies, and sedimentation studies.

Section 22 is funded annually by Congress. Assistance is limited to $500,000 in federal funds per state or Tribe per year. Individual studies, of which there may be more than one per state or Tribe per year, generally range in cost from $25,000 to over $100,000. These studies are cost-shared on a 50/50 basis (50 percent federal/50 percent non-federal sponsor). The study sponsor has the option of providing in-kind services for up to 100 percent of its share of the study cost.

National Fire Plan Program 15.228: Wildland Urban Interface Community and Rural Fire Assistance. This program is designed to implement the National Fire Plan and assist communities at risk from catastrophic wildland fires. The program provides grants, technical assistance, and training for community programs that develop local capability, including: Assessment and planning, mitigation activities, and community and

homeowner education and action; hazardous fuels reduction activities, including the training, monitoring or maintenance associated with such hazardous fuels reduction activities, on federal land, or on adjacent nonfederal land for activities that mitigate the threat of catastrophic fire to communities and natural resources in high risk areas; and, enhancement of knowledge and fire protection capability of rural fire districts through assistance in education and training, protective clothing and equipment purchase, and mitigation methods on a cost share basis. More information: http://www.federalgrantswire.com/wildland-urban-interface-community-and-rural-fire-assistance.html#.WCx8ekYzWUk

U.S. Fish & Wildlife Service, Rural Fire Assistance Grants. Each year, the U.S. Fish & Wildlife Service provides Rural Fire Assistance (RFA) grants to neighboring community fire departments to enhance local wildfire protection, purchase equipment, and train volunteer firefighters. Service fire staff also assist directly with community projects. These efforts reduce the risk to human life and better permit FWS firefighters to interact and work with community fire organizations when fighting wildfires. The Department of the Interior (DOI) receives an appropriated budget each year for an RFA grant program. The maximum award per grant is $20,000. The DOI assistance program targets rural and volunteer fire departments that routinely help fight fire on or near DOI lands. More information: http://www.fws.gov/fire/living_with_fire/rural_fire_assistance.shtml

U.S. Department of Agriculture, Community Facilities Loans and Grants. Provides grants (and loans) to state, local and Indian tribal governments, as well as private and nonprofit organizations and user-owned cooperatives to improve community facilities for essential services to rural residents. Projects can include fire and rescue services including purchase of fire-fighting equipment for rural areas. No match is required. More information:
http://www.usda.gov/wps/portal/usda/usdahome?navid=GRANTS_LOANS

Hazardous Materials Emergency Preparedness Grants. The U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration awards over $97 million in grants through its pipeline and hazardous materials safety programs. The awards are distributed to states, local communities, tribal entities, universities, and non-profit organizations to support pipeline and hazardous materials safety programs. Award recipients can use the funds for training first responders, educating the public on local safety initiatives, and encouraging the development of new pipeline technologies. More information: http://www.phmsa.dot.gov/hazmat/grants

U.S. Department of Homeland Security. Enhances the ability of states, local and tribal jurisdictions, and other regional authorities in the preparation, prevention, and response to terrorist attacks and other disasters, by distributing grant funds. Localities can use grants for planning, equipment, training and exercise needs. These grants include, but are not limited to areas of Critical Infrastructure Protection Equipment and Training for First Responders, and Homeland Security Grants. More information: http://www.dhs.gov/

Rural Fire Capacity Program Grants. The purpose of these grants is to organize, train and equip local firefighters to prevent and suppress wildfires. Communities under 10,000 in population are eligible for the funding. Smaller communities may join together in a group effort to submit an application, even if their combined population is over 10,000. There is no pre-set award amount. Financial assistance on any project, during any fiscal year, requires a non-federal match for project expenditures. More information: http://dnrc.mt.gov/grants-and-loans

Western States Wildland Urban Interface. National Fire Plan funds are available to mitigate risk from wildland fire within the WUI. Funds are awarded through a competitive process to 22 western states and territories through the Western WUI Grant Program. Each year, the Montana DNRC accepts proposals from partners around the state for submission to the National Fire Plan competitive process. DNRC scores and prioritizes these proposals before sending them on to the national competitive process. Non-profit organizations,

conservation districts, county and municipal governments, and fire departments. Individual landowners may not apply but may be eligible for cost-share opportunities through this program. Each grant request is limited to a maximum of $300,000. More information: http://dnrc.mt.gov/grants-and-loans

Hazardous Fuel Reduction Grants. These grants are for hazardous fuel reduction on private lands to protect communities adjacent to National Forest System Lands where prescribed fire activities are planned. Prescribed fire activities must be imminent (to take place within 3 years of the award). Non-profit organizations, conservation districts, tribal, county and municipal governments, fire departments are eligible for this funding. Award amounts typically range from $50,000 to $100,000 depending upon availability of funding. More information: http://dnrc.mt.gov/grants-and-loans

Renewable Resource Grant Program. Administered by the Montana DNRC, this program provides both grant and loan funding for public facility and other renewable resource projects. Projects that conserve, manage, develop or protect Montana's renewable resources are eligible for funding. Numerous public facility projects including drinking water, wastewater and solid waste development and improvement projects have received funding through this program. Other projects that have been funded include irrigation rehabilitation, dam repair, soil and water conservation and forest enhancement. More information: http://dnrc.mt.gov/grants-and-loans

Community Development Block Grants (CDBG). The U.S. Department of Commerce administers the CDBG program which are intended to provide low and moderate-income households with viable communities, including decent housing, a suitable living environment, and expanded economic opportunities. Eligible activities include community facilities and improvements, roads and infrastructure, housing rehabilitation and preservation, development activities, public services, economic development, planning, and administration. Public improvements may include flood and drainage improvements. In limited instances, and during the times of "urgent need" (e.g. post disaster) as defined by the CDBG National Objectives, CDBG funding may be used to acquire a property located in a floodplain that was severely damaged by a recent flood, demolish a structure severely damaged by an earthquake, or repair a public facility severely damaged by a hazard event. CDBG funds can be used to match FEMA grants. More information:
http://www.hud.gov/offices/cpd/communitydevelopment/programs/

2021 American Rescue Plan Act. U.S. Dept. of Commerce, Economic Development Administration was allocated $3 billion in supplemental funding to assist communities nationwide in their efforts to build back better by accelerating the economic recovery from the coronavirus pandemic and building local economies that will be resilient to future economic shocks. EDA is making a Coal Communities Commitment, allocating $300 million of its $3 billion American Rescue Plan appropriation to ensure support for these communities as they recover from the pandemic and create new jobs and opportunities, including through the creation or expansion of a new industry sector. This commitment will be fulfilled through $100 million in Build Back Better Regional Challenge grants and $200 million in Economic Adjustment Assistance grants.
More Information: https://eda.gov/funding-opportunities/

Treasure State Endowment Program (TSEP). The TSEP was established to help solve serious health and safety problems and assist communities with the financing of public facilities projects. The program helps local governments with infrastructure planning as well as constructing or upgrading drinking water systems, wastewater treatment facilities, sanitary or storm sewer systems, solid waste disposal and separation systems, and bridges. Funding is available in the following program categories: Planning grants may be used for preliminary engineering reports for the following projects: drinking water systems, wastewater treatment facilities, sanitary or storm sewer systems, solid waste disposal and separation systems, bridges, and Comprehensive Capital Improvements Plan. Project grants assist drinking water, wastewater, storm sewer or storm drain, solid waste, and bridge projects. Eligible costs include, but are not limited to: engineering designs

and inspection, grant administration, surveying or geotechnical, and construction. Emergency grants are awarded to address imminent threats or actual occurrences of an event causing immediate peril to life, property, or the environment that can be averted or minimized with timely action.

General Services Administration, Sale of Federal Surplus Personal Property. This program sells property no longer needed by the federal government. The program provides individuals, businesses and organizations the opportunity to enter competitive bids for purchase of a wide variety of personal property and equipment. Normally, there are no restrictions on the property purchased. More information: http://www.gsa.gov/portal/category/21045

Crop Insurance. Crop insurance is available to agricultural producers, including farmers, ranchers, and others to protect themselves against either the loss of their crops due to natural disasters, such as hail, drought, and floods, or the loss of revenue due to declines in the prices of agricultural commodities. In the United States, a subsidized multi-peril federal insurance program, administered by the Risk Management Agency, is available to most farmers. The program is authorized by the Federal Crop Insurance Act, as amended. Federal crop insurance is sold and serviced through private insurance companies. A portion of the premium, as well as the administrative and operating expenses of the private companies, is subsidized by the federal government. The Federal Crop Insurance Corporation reinsures the companies by absorbing some of the losses of the program when indemnities exceed total premiums. Several revenue insurance products are available on major crops as a form of additional coverage. https://cropinsuranceinamerica.org/crop-insurance-101/

Other Resources

FEMA: Grant Application Training. Each year, FEMA partners with the State on training courses designed to help communities be more successful in their applications for grants. Contact your State Hazard Mitigation Officer for course offering schedules. Example Courses: Unified Hazard Mitigation Grant Assistance Application Development Course; and Benefit Cost Analysis (BCA) Course.

FEMA: Community Assistance Visit. It may be appropriate to set up a Community Assistance Visit with FEMA to provide technical assistance to communities in the review and/or updating of their floodplain ordinances to meet the new model ordinance. Consider contacting your State NFIP Coordinator for more information.

FEMA: Building Science. The Building Science branch develops and produces multi-hazard mitigation publications, guidance materials, tools, technical bulletins, and recovery advisories that incorporate the most up-to-date building codes, floodproofing requirements, seismic design standards, and wind design requirements for new construction and the repair of existing buildings. More Information: https://www.fema.gov/building-science

EPA: Smart Growth in Small Towns and Rural Communities. EPA has consolidated resources just for small towns and rural communities to help them achieve their goals for growth and development while maintaining their distinctive rural character. More information:
https://www.epa.gov/smartgrowth/smart-growth-small-towns-and-rural-communities

EPA: Hazard Mitigation for Natural Disasters: A Starter Guide for Water and Wastewater Utilities. The EPA released guidance on how to mitigate natural disasters specifically for water and wastewater utilities. More information:
https://www.epa.gov/waterutilityresponse/hazard-mitigation- natural-disasters

National Integrated Drought Information System. The National Drought Resilience Partnership may provide some additional resources and ideas to mitigate drought hazards and increase awareness of droughts. https://www.drought.gov/drought/what-nidis/national-drought-resilience-partnership.

Beyond the Basics: Best Practices in Local Mitigation Planning. The product of a 5-year research study where the Costal Hazards Center and the Center for Sustainable Community Design analyzed local mitigation plans to assess their content and quality. The website features numerous examples and best practices that were drawn from the analyzed plans. More info: http://mitigationguide.org/

STAR Community Rating System. Consider measuring your mitigation success by participating in the STAR Community Rating System. Local leaders can use the STAR Community Rating System to assess how sustainable they are, set goals for moving ahead and measure progress along the way. More information: https://www.usgbc.org/resources/star-community-rating-system-technical-guide-v2

Flood Economics. The Economist Intelligence Unit analyzed case studies and state-level mitigation data in order to gain a better understanding of the economic imperatives for investment in flood mitigation. More information: http://floodeconomics.com/

Headwaters Economics. Headwaters Economics is an independent, nonprofit research group that works to improve community development and land management decisions in the West. More information: https://headwaterseconomics.org/

5.5 Mitigation Strategy Development

A comprehensive range of specific mitigation actions and projects were identified and analyzed for each jurisdiction to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure. This occurred during Planning Team meetings when the hazard-specific example mitigation projects were reviewed, as presented in **Appendix D-1**.

This subsection discusses the identification, prioritization, analysis and implementation plan of mitigation actions for Stillwater County and the City of Columbus. A problem statement associated with each mitigation strategy is included in **Table 5.5-3**.

5.5.1 Mitigation Strategy Update and Reconciliation

The Planning Team reviewed the list of mitigation actions (projects) from the 2015 PDM Plan and determined which were complete, should be deleted, or reworded for the 2021 mitigation strategy during monthly Planning Team conference calls held during February through June 2021 including changes in priority. **Appendix D-2** presents a reconciliation of mitigation projects and their status.

Concerted efforts were made to assure that the county develop mitigation strategies that included activities and initiatives covering the range of mitigation action types described in FEMA planning guidance (FEMA "Local Mitigation Planning Handbook" March 2013), specifically:

- Prevention Projects – These actions include governmental regulatory authorities, including policies or codes that influence the way land and buildings are being developed and built.
- Property Protection Projects – Actions that involve the modification of existing buildings or structures to protect them from a hazard, or removal from the hazard area. Examples include acquisition, elevation, relocations, structural retrofits, storm shutters, and shatter-resistant glass. Wildland fuel reduction projects are also included in this category.
- Structural Projects - These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures

as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.

- Natural Resource Protection Projects – These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- Education and Awareness Programs – These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as the National Flood Insurance Program and Community Rating System, StormReady (NOAA) and FireWise (NFPA) Communities.
- Emergency Service Projects – These are actions to enhance community preparedness through training and acquisition of equipment.
- Mapping/Analysis/Planning Projects – These actions include development of mapping and planning documents to assist with implementation of mitigation strategies.

In consideration of federal and state mitigation guidance, the MHMP Planning Team recognized that all communities would benefit from the inclusion of certain mitigation actions. These include initiatives to address vulnerable public and private properties, including repetitive loss properties; initiatives to support continued and enhanced participation in the NFIP; improved public education and awareness programs; and initiatives to support county-wide and regional efforts to build greater local mitigation capabilities.

Mitigation actions included in the 2021 Stillwater County mitigation strategy are presented in **Table 5.5-2** at the end of this section. **Appendix D-3** contains a mitigation action plan with individual project worksheets.

5.5.2 Mitigation Strategy Benefit/Cost Review and Prioritization

Each of the proposed mitigation actions has value; however, time and financial constraints do not permit all projects to be implemented immediately. By prioritizing the actions, the most critical, cost effective projects can be achieved in the short term. Mitigation actions retained and developed for this updated MHMP were re-prioritized to reflect current conditions and anticipated needs over the next five years.

Section 201.6.c.3iii of 44CFR requires the prioritization of the action plan to emphasize the extent to which benefits are maximized according to a cost/benefit review of the proposed projects and their associated costs. Stated otherwise, cost-effectiveness is one of the criteria that must be applied during the evaluation and prioritization of all actions comprising the overall mitigation strategy.

The benefit/cost review used for the evaluation and prioritization of projects in this plan was qualitative, i.e. it does not include the level of detail required by FEMA for project grant eligibility under the HMGP and PDMC grant program.

- **Costs** are the total cost for the action or project, and may include administrative costs, construction costs (including engineering, design and permitting), and maintenance costs.
- **Benefits** are the savings from losses avoided attributed to the implementation of the project, and may include life-safety, structure and infrastructure damages, loss of service or function, and economic and environmental damage and losses.

When available, jurisdictions were asked to identify the actual or estimated dollar value for project costs and associated benefits. Having defined costs and benefits allows a direct comparison of benefits versus costs,

and a quantitative evaluation of project cost-effectiveness. Often, however, numerical costs and/or benefits have not been identified, or may be impossible to quantitatively assess.

For the purposes of this planning process, a cost-benefit matrix was developed to rank the mitigation projects using the following criteria. Each project was assigned a "high", "medium", or "low" rank for *Population Impacted, Property Impacted*, *Project Feasibility* and *Cost*, as described below:

- For the *Population Protected* category, a "high" rank represents greater than 50 percent of County residents would be protected by implementation of the mitigation strategy; a "medium" rank represents 20 to 50 percent of County residents would be protected; and, a "low" rank represents less than 20 percent of County residents would be protected.
- For the *Property Protected* category, a "high" represents that greater than $500,000 worth of property would be protected through implementation of the mitigation strategy; "medium" represents that $100,000 to $500,000 worth of property would be protected; and, "low" would be less than $100,000 would be protected.
- For the *Project Feasibility* category a "high" rank represents that technology is available and implementation is likely; a "medium" rank indicates technology may be available but implementation could be difficult; and, a "low" rank represents that no technology is available or implementation would be unlikely.
- For the *Project Cost* category, a "high" represents that the mitigation project would cost more than $500,000; a "medium" rank represents the project cost would be between $100,000 and $500,000; and, "low" represents the project would cost less than $100,000.

The overall cost-benefit was then calculated by summing the total score for each project. **Table 5.5-1** presents the cost-benefit scoring matrix. The mitigation action plans in **Appendix D-3** present the scoring of each project.

Table 5.5-1. Cost-Benefit Scoring Matrix

Score	Population Protected	Property Protected	Project Feasibility	Cost
High	3	3	3	1
Medium	2	2	2	2
Low	1	1	1	3

After considering all mitigation projects, the MHMP Planning Team prioritized the projects as high, medium, or low based on which projects were most needed to protect life and property. Prioritization of the projects serves as a guide for choosing and funding projects. **Table 5.5-2** presents the County priority for each project.

5.5.3 Project Implementation

The MHMP Planning Team reviewed the projects and assigned a corresponding county, city department responsible for its implementation. Cooperating organizations for implementation may also include local, federal or regional agencies that are capable of implementing activities and programs. The Planning Team identified a schedule for implementation and potential funding sources. The schedule for implementation included several categories including: "ongoing" for projects that are part of the County's emergency management program; "short-term" for projects to be completed within 1-2 years; "mid-term" for projects to be completed within 3-4 years; and, "long-term" for projects to be completed in 5 or more years.

Implementation details are shown in below**.** Stillwater County DES will be responsible for mitigation project administration.

#	Action/Project Name & Description	Hazards Mitigated	Jurisdiction	Lead Agency	Partner Agencies	Cost Estimate	Potential Funding	Timeline	Priority	Status
1	Control mosquito populations in wet areas.	Communicable Disease	Stillwater County, Columbus	Columbus Mosquito District	County Public Health	High	City General Fund, District General Fund	Ongoing	Medium	In Progress
2	Continue robust inspection, surveillance, and vaccination programs to ensure public safety.	Communicable Disease	Stillwater County, Columbus	County Public Health	City-County Planning Board DPHHS	Moderate	County General Fund	Ongoing	High	In Progress
3	Educate community members on public health topics.	Communicable Disease	Stillwater County, Columbus	County Public Health	Columbus Police Department, DPHHS	Low	County General Fund, MT DPHHS, CDBG	Ongoing	Medium	In Progress
4	Identify key stakeholders involved in a response to communicable diseases and develop best practices for managing the response. Develop a playbook that can be used for all agencies involved in the response.	Communicable Disease	Stillwater County	Stillwater County Public Health	DPHHS, MT DES	Moderate	DPHHS	Not Started	Low	New in 2024

#	Action/Project Name & Description	Hazards Mitigated	Jurisdiction	Lead Agency	Partner Agencies	Cost Estimate	Potential Funding	Timeline	Priority	Status
5	Conduct a vulnerability assessment of critical cyber infrastructure in the county.	Cyber Security	Stillwater County, Columbus	Town Commissioners	MATIC, DHS/ CISA, County DES	High	County General Fund, SLCGP	Short-term	High	In Progress
6	Develop training protocol for employees on cyber security for city and county employees.	Cyber Security	Stillwater County, Columbus	Town Commissioners	County IT Department	Low	City & County General Funds, SLCGP, MACo	Ongoing	High	In Progress
7	Implement a community outreach program on email risks.	Cyber Security	Stillwater County, Columbus	City-County Planning Board	Sheriff's Department DHS CISA	Low	City & County General Funds	Ongoing	Low	Not Started
8	Target potentially affected citizens with information about the dam failure risk in their area and include information on exercises.	Dam Failure	Stillwater County, Columbus	County DES	Sibanye-Stillwater Mining, NorthWestern Energy, Town Commissioners	Low	County General Fund, Utility, CDBG	Ongoing	Low	In Progress

#	Action/Project Name & Description	Hazards Mitigated	Jurisdiction	Lead Agency	Partner Agencies	Cost Estimate	Potential Funding	Timeline	Priority	Status
9	Develop and distribute range and agriculture management tools for local producers using weather and soil monitoring, planning, and education.	Drought	Stillwater County, Columbus	City-County Planning Board	MSU Extension, DES, USDA	Moderate	County General Fund	Ongoing	Medium	Not Started
10	Develop a Drought Management/Adaptation Plan	Drought	Stillwater County, Columbus	Stillwater DES	Stillwater Planning Department	Moderate	County General Fund	Short-term	Medium	New in 2024
11	Educate owners about unreinforced masonry buildings regarding earthquake stability.	Earthquake	Stillwater County, Columbus	County DES	County Planning Department	Low	County General Fund	Short-term	Low	New in 2024
12	Develop targeted outreach materials about retrofitting homes on how to improve structural integrity against earthquake hazards	Earthquake	Stillwater County, Columbus	County DES	County Building Department	Low	County General Fund	Short-term	Low	New in 2024
13	Continue compliance with the National Flood Insurance Program and the Stillwater County Flood Ordinance.	Flooding	Stillwater County, Columbus	County Floodplain Administrator	Columbus Town Commissioners, DES	Moderate	County General Fund	Ongoing	High	Annual Implementation

#	Action/Project Name & Description	Hazards Mitigated	Jurisdiction	Lead Agency	Partner Agencies	Cost Estimate	Potential Funding	Timeline	Priority	Status
14	Consider joining the Community Rating System volunteer incentive program.	Flooding	Stillwater County, Columbus	County Floodplain Administrator	Columbus Town Commissioners, DES	Low	County General Fund	Long-term	Medium	Not Started
15	Upgrade bridges, culverts, and roads to allow sufficient passage of floodwaters.	Flooding	Stillwater County, Columbus	County Road Superintendent	Columbus Public Works	Very High	CDBG, HMGP, FMA	Ongoing	High	Not Started
16	Continue to implement the storm water plan in Columbus.	Flooding	Columbus	Columbus Public Works Department	County Planning Department	High	City General Fund, CDBG	Ongoing	High	In Progress
17	Determine mitigation for wastewater lagoons in Columbus which are in the mapped floodplain.	Flooding	Columbus	Columbus Public Works Department	Columbus Town Council, County Planning Department	Moderate	FMA, BRIC< HMGP, CDBG, City General Fund	Mid-term	High	In Progress
18	Distribute information about building in the floodplain.	Flooding	Stillwater County, Columbus	County DES	County Floodplain Administrator, Columbus Town	Low	CDBG, HMGP, BRIC, DNRC	Ongoing	Medium	Annual Implementation

#	Action/Project Name & Description	Hazards Mitigated	Jurisdiction	Lead Agency	Partner Agencies	Cost Estimate	Potential Funding	Timeline	Priority	Status
					Commissioners, DNRC					
19	Support completion of floodplain mapping and work towards adoption of new maps.	Flooding	Stillwater County, Columbus	DNRC Floodplain Mapping Program	DES, County Floodplain Administrator, Town Commissioners	Moderate	County General Fund	Mid-term	High	In Progress
20	Evaluate the feasibility of protecting the Island water source impacted by channel migration in the Yellowstone River and look for a site for an additional well.	Flooding	Columbus	Columbus Public Works	DES	Moderate	City General Fund, HMGP, USDA Rural Development Water & Environmental Programs, CDBG	Mid-term	High	Not Started
21	Complete a survey of county critical infrastructure near the waterways to identify potential mitigation projects	Flooding	Stillwater County	County DES	DNRC Floodplain Mapping Program	Moderate	DNRC	Not Started	Medium	New in 2024

#	Action/Project Name & Description	Hazards Mitigated	Jurisdiction	Lead Agency	Partner Agencies	Cost Estimate	Potential Funding	Timeline	Priority	Status
	to protect those identified sites.									
22	Install and monitor USGS stream gauges at identified sites on the Stillwater River, East and West Rosebud Creek	Flooding	Stillwater County	County DES	USGS	Moderate	USGS	Not Started	Medium	New in 2024
23	Complete a holistic survey of the main waterways in the county to identify and prioritize mitigation efforts.	Flooding	Stillwater County	Stillwater County – Contracted Engineering Firm	DNRC Floodplain Mapping Program	Moderate	Unknown	Not Started	Medium	New in 2024
24	Continue to be notified when large events come through the county.	Human Conflict	Stillwater County, Columbus	Sheriff's Department	MATIC, MHP, Town Commissioners	Low	County General Fund	Ongoing	Medium	Not Started
25	Explore implementing a permit system for large events taking place in the county.	Human Conflict	Stillwater County, Columbus	Sheriff's Department	DES, Columbus City-County Planning Board,	Low	County General Fund	Mid-term	High	In Progress

#	Action/Project Name & Description	Hazards Mitigated	Jurisdiction	Lead Agency	Partner Agencies	Cost Estimate	Potential Funding	Timeline	Priority	Status
26	Design, develop and implement an Active Shooter Hostile Event (ASHE) Guidance Document that includes all response partners using an All-Hazards approach	Human Conflict	Stillwater County	Stillwater County DES	DOJ, MT DES	Low	HSGP	Ongoing	High	New in 2024
27	Design, develop and implement an ASHE training program that utilizes the Rescue Task Force concept	Human Conflict	Stillwater County	Stillwater County DES	Carbon and Yellowstone Counties, DOJ	Moderate	HSGP	Ongoing	High	New in 2024
28	Design, develop and implement a series of ASHE training exercises - utilizing a regional approach that starts with a tabletop exercise.	Human Conflict	Stillwater County	Stillwater County DES	Carbon and Yellowstone Counties, DOJ	Moderate	HSGP	Ongoing	High	New in 2024
29	Conduct a study of landslide prone areas.	Landslide	Stillwater County	County Road & Bridge Department	DES, County Planning	Moderate	County General Fund, HMGP, BRIC	Long-term	Low	Not Started
30	Implement preservation and stabilization measures at slide-prone areas.	Landslide	Stillwater County	County Road & Bridge	DES, County Planning	High	County General Fund, Landowne	Long-term	Low	Not Started

#	Action/Project Name & Description	Hazards Mitigated	Jurisdiction	Lead Agency	Partner Agencies	Cost Estimate	Potential Funding	Timeline	Priority	Status
				Department			rs, HMGP, BRIC			
31	Map areas of landslide risk to inform future development around Columbus	Landslide	Columbus	Columbus Planning Department	DES, County Planning	Low	Town General Fund	Short-term	Low	New in 2024
32	Report required incidents to the appropriate State or Federal agencies to support situational awareness, a common operation picture, and improve resource ordering and management.	Multi: Communicable Disease, Cyber-Attack, Dam Failure, Flooding, Hazmat, Landslide, Human Conflict, Transportation Accidents, Wildfire	Stillwater County	Stillwater County Environmental Health	County DES	Low	General Fund	Ongoing	Medium	New in 2024
33	Coordination - Design, develop and implement an EOC Playbook that will be utilized for all types of incidents	Multi: Cyber-Attack, Dam Failure, Earthquake, Flooding, Hazmat, Landslide, Summer Weather, Winter Weather, Human Conflict, Tornado/Wind, Transportation	Stillwater County	County DES	MT DES	Low	General Fund, HSGP	Ongoing	Medium	New in 2024

#	Action/Project Name & Description	Hazards Mitigated	Jurisdiction	Lead Agency	Partner Agencies	Cost Estimate	Potential Funding	Timeline	Priority	Status
		Accidents, Volcanic Ash, Wildfire								
34	Purchase and install generators at critical facilities and potential shelter locations.	Multi: Cyber-Attack, Dam Failure, Earthquake, Flooding, Summer Weather, Winter Weather, Human Conflict, Tornado/Wind, Volcanic Ash, Wildfire	Stillwater County, Columbus	County DES	Columbus Public Works	Moderate	County and City General Fund, HMGP, BRIC, CDBG-DR	Ongoing	High	Not Started
35	Identify and deliver position specific training for individuals that will staff the EOC during an emergency.	Multi: Dam Failure, Drought, Earthquake, Flooding, Hazmat, Landslide, Summer Weather, Winter Weather, Human Conflict, Tornado/Wind, Transportation Accidents, Volcanic Ash, Wildfire	Stillwater County	County DES	County DES	Low	HSGP, MT DES	Ongoing	Medium	New in 2024

#	Action/Project Name & Description	Hazards Mitigated	Jurisdiction	Lead Agency	Partner Agencies	Cost Estimate	Potential Funding	Timeline	Priority	Status
36	Collaborate with neighboring jurisdictions to design, develop and implement a Regional EOC that can be used during large scale incidents or disasters	Multi: Dam Failure, Drought, Earthquake, Flooding, Hazmat, Landslide, Summer Weather, Winter Weather, Human Conflict, Tornado/Wind, Transportation Accidents, Volcanic Ash, Wildfire	Stillwater County	County DES	Carbon and Yellowstone County DES	Low	HSGP	Ongoing	High	New in 2024
37	Continue to provide emergent alerting for situational awareness to citizens using the county based alerting service or IPAWS.	Multi: Dam Failure, Earthquake, Flooding, Hazmat, Landslide, Summer Weather, Winter Weather, Human Conflict, Tornado/Wind, Transportation Accident, Volcanic Ash, Wildfire	Stillwater County	County DES	County Sheriff	Low	General Fund	Ongoing	Low	New in 2024

#	Action/Project Name & Description	Hazards Mitigated	Jurisdiction	Lead Agency	Partner Agencies	Cost Estimate	Potential Funding	Timeline	Priority	Status
38	Identify and deliver appropriate ICS training to all county staff and 1st Responders that would be involved in an emergency or disaster response. 100, 200, 700, 800 for all staff - 300 & 400 for command staff and 191 for EOC staff - position specific training for select positions.	Multi: Dam Failure, Earthquake, Flooding, Hazmat, Landslide, Summer Weather, Winter Weather, Human Conflict, Tornado/Wind, Transportation Accidents, Volcanic Ash, Wildfire	Stillwater County	County DES	County Fire and EMS Departments	Moderate	MT DES, HSGP	Not Started	Medium	New in 2024
39	Provide improvements for the emergency communications system by updating or expanding existing infrastructure, revising policies or procedures, and incorporating new technologies. Integrate LMR system with LTE to enhance current LMR system.	Multi: Dam Failure, Earthquake, Flooding, Hazmat, Landslide, Summer Weather, Winter Weather, Human Conflict, Tornado/Wind, Transportation Accidents, Volcanic Ash, Wildfire	Stillwater County	County DES	County Fire and EMS Departments	Moderate	HSGP, MT DES	Ongoing	High	New in 2024

#	Action/Project Name & Description	Hazards Mitigated	Jurisdiction	Lead Agency	Partner Agencies	Cost Estimate	Potential Funding	Timeline	Priority	Status
40	Ensure that all county first responders possess and maintain adequate training and education to complete the requirements of their job or assignment and aligns with their departmental capabilities.	Multi: Dam Failure, Earthquake, Flooding, Hazmat, Landslide, Summer Weather, Winter Weather, Human Conflict, Tornado/Wind, Transportation Accidents, Volcanic Ash, Wildfire	Stillwater County	County DES	County Fire and EMS Departments, MT DES, DNRC	Moderate	HSGP, MT DES	Not Started	Medium	New in 2024
41	Revamp 911 dispatch center by improving citizen/community access to emergency notifications and expanding Resource Management Department by establishing a Regional Dispatch Center that allows multiple counties to gather and communicate from one central location during regional hazard events, such as dam failures, earthquakes, major floods, severe weather, volcanic ash occurrences, and wildfires.	Multi: Dam Failure, Earthquake, Flooding, Hazmat, Landslide, Summer Weather, Winter Weather, Human Conflict, Tornado/Wind, Transportation Accidents, Volcanic Ash, Wildfire	Stillwater County	County DES	County Planning, DOJ	High	DOJ, HSGP	Short Term	High	New in 2024

#	Action/Project Name & Description	Hazards Mitigated	Jurisdiction	Lead Agency	Partner Agencies	Cost Estimate	Potential Funding	Timeline	Priority	Status
42	Update the countywide and city growth policies to require stricter consideration of high hazard areas during subdivision reviews.	Multi: Dam Failure, Earthquake, Flooding, Hazmat, Landslide, Summer Weather, Winter Weather, Tornado/Wind, Wildfire	Columbus	Columbus Town Commissioners	Columbus City-County Planning Board	Low	County and City General Fund	Short-term	Medium	Not Started
43	Integrate and imbed GIS services into all aspects of emergency service planning to provide improved situational awareness and promote a common operation picture.	Multi: Dam Failure, Earthquake, Flooding, Hazmat, Landslide, Summer Weather, Winter Weather, Tornado/Wind, Wildfire	Stillwater County	Stillwater County Geographic Information System & Rural Addressing	County Fire, EMS, DES Departments	Moderate	HSGP, EMPG	Ongoing	High	New in 2024
44	Maintain trees that could impact county or city property.	Severe Summer Weather	Stillwater County, Columbus	County Road & Bridge	Columbus Public Works	Moderate	County and City General Fund	Ongoing	Medium	In Progress
45	Implement the tree maintenance ordinance and address problem trees.	Severe Summer Weather	Columbus	Columbus Public Works Dept.	Chamber of Commerce	Moderate	City General Fund	Short-term	Medium	Not Started

#	Action/Project Name & Description	Hazards Mitigated	Jurisdiction	Lead Agency	Partner Agencies	Cost Estimate	Potential Funding	Timeline	Priority	Status
46	Conduct workshops and educational programs focused on severe weather for the public and in schools.	Severe Summer Weather	Stillwater County, Columbus	County DES	NWS, Columbus City-County Planning Board	Low	County General Fund, DNRC, NWS	Ongoing	Low	Not Started
47	Explore a policy to close the interstate highway when conditions warrant and provide a parking plan for semi-trucks and people who become stranded.	Severe Summer/ Winter Weather, Transportation Accidents	Stillwater County, Columbus	County DES	Sheriff's Office, MHP, MDT, Columbus City-County Planning Board	Low	County General Fund, MDT, MHP	Mid-term	Medium	In Progress
48	Distribute winter weather preparedness information to area residents.	Severe Winter Weather	Stillwater County, Columbus	County DES	Chamber of Commerce, NWS, MDT, Columbus PD	Low	County General Fund, MT DES, MDT	Ongoing	Low	Not Started

#	Action/Project Name & Description	Hazards Mitigated	Jurisdiction	Lead Agency	Partner Agencies	Cost Estimate	Potential Funding	Timeline	Priority	Status
49	Encourage utility companies to bury electric and communication lines in hazard areas.	Severe Winter Weather, Severe Summer Weather	Stillwater County, Columbus	County DES	Electric Companies, County Fire Warden, Town Commissioners	Low	County General Fund	Ongoing	High	Not Started
50	Ensure the community has adequate equipment for snow removal	Severe Winter Weather	Stillwater County, Columbus	County Fire Department	County Public Works Department	Medium	County General Fund	Mid-term	High	New in 2024
51	Schedule seasonal outreach program focused on mitigating severe winter weather hazards by educating homeowners about retrofitting home roofs to withstand snow loads and the benefits of adding insulation to attics and wall spaces	Severe Winter Weather	Stillwater County, Columbus	County Fire Department	County Public Works Department	Medium	County General Fund	Mid-term	High	New in 2024

#	Action/Project Name & Description	Hazards Mitigated	Jurisdiction	Lead Agency	Partner Agencies	Cost Estimate	Potential Funding	Timeline	Priority	Status
52	Ensure critical facilities and emergency shelters have alternative power sources during emergencies	Tornado/High Wind	Stillwater County, Columbus	Stillwater County DES	Electric Companies, County Fire, Town Commissioners	Low	FEMA HMA HMGP, BRIC	Mid-term	Low	New in 2024
53	Consider adoption of wind-resistant building code for tornadoes and windstorms	Tornado/High Wind	Columbus	Columbus Building Department	Electric Companies, County Fire, Town Commissioners	Low	FEMA HMA HMGP, BRIC	Mid-term	Low	New in 2024
54	Explore placement of an emergency railroad crossing east of the Sibanye-Stillwater Metallurgical Complex.	Transportation Accidents	Columbus	Columbus Public Works	County Roads Department, DES, County Attorney, Commissioners, Sibanye-Stillwater Mining Company	Low	Montana Rail Link, Sibanye-Stillwater Mining Company, County General Fund	Mid-term	Medium	In Progress

#	Action/Project Name & Description	Hazards Mitigated	Jurisdiction	Lead Agency	Partner Agencies	Cost Estimate	Potential Funding	Timeline	Priority	Status
55	Disseminate information on wildfire hazard reduction and seasonal fire danger to rural property owners.	Wildfire	Stillwater County, Columbus	County DES	Fire Chiefs, Department, Fire Warden, Columbus VFD	Moderate	County General Fund, DNRC, USDA Forest Service's WUI Community Fire Assistance Program	Ongoing	Low	Annual Implementation
56	Partner with surrounding counties and present workshops targeting county planning staff, planning boards, architects, engineers, and realtors focused on defensible space and FireWise principles.	Wildfire	Stillwater County, Columbus	County DES	Fire Chiefs, Department, Fire Warden, Columbus City-County Planning Board	Low	County General Fund	Ongoing	Medium	In Progress

#	Action/Project Name & Description	Hazards Mitigated	Jurisdiction	Lead Agency	Partner Agencies	Cost Estimate	Potential Funding	Timeline	Priority	Status
57	Promote the landowner fuel reduction cost- share programs available.	Wildfire	Stillwater County	County Fire Warden	DNRC, Fire Chiefs, Departments	Low	County General Fund, USDA Forest Service's WUI Community Fire Assistance Program	Ongoing	Low	In Progress
58	Provide timely messaging on wildfire smoke to protect vulnerable populations.	Wildfire	Stillwater County, Columbus	County Public Health	County Fire Depts., Columbus VFD	Moderate	County General Fund	Ongoing	Low	Not Started
59	Investigate developing a regulatory mechanism to ensure that subdivisions are built as approved and fire protection systems are initially and periodically certified.	Wildfire	Stillwater County, Columbus	City-County Planning Board	Fire Warden, Fire Chiefs, Town Commissioners, County Attorney	Moderate	County General Fund	Mid-term	Medium	In Progress

#	Action/Project Name & Description	Hazards Mitigated	Jurisdiction	Lead Agency	Partner Agencies	Cost Estimate	Potential Funding	Timeline	Priority	Status
60	Incorporate State's WUI development guidelines into subdivision regulations.	Wildfire	Stillwater County, Columbus	City-County Planning Board	Town Commissioners	Low	County General Fund	Short-term	Medium	In Progress
61	Encourage state and federal agencies and landowners to conduct fuel reduction on their property in the WUI.	Wildfire	Stillwater County, Columbus	County Fire Warden	Subdivision HOAs, USFS, BLM, DNRC, Fire Chief's Department Columbus VFD	Low	USFS, BLM, DNRC, USDA Forest Service's WUI Community Fire Assistance Program	Ongoing	Medium	Not Started
62	Encourage homeowner associations to review their covenants to incorporate fire resistant materials.	Wildfire	Stillwater County, Columbus	County Fire Warden	Fire Chief's Department Columbus VFD	Moderate	County General Fund	Ongoing	Low	In Progress

#	Action/Project Name & Description	Hazards Mitigated	Jurisdiction	Lead Agency	Partner Agencies	Cost Estimate	Potential Funding	Timeline	Priority	Status
63	Continue to increase the size of ingress/egress roads where possible to create fire breaks.	Wildfire	Stillwater County, Columbus	County Fire Warden	Road Dept., Fire Chiefs Departments, Columbus Public Works	High	County General Fund, Landowners	Ongoing	Medium	Not Started
64	Continue to update digital WUI map with completed fuel management projects and use for project planning.	Wildfire	Stillwater County	County Fire Warden	GIS, Planning, Fire Chief's Department, USFS, BLM, DNRC	Moderate	USFS, BLM, DNRC, CWDG	Ongoing	Low	In Progress
65	Continue to conduct individual home audits for residences in the WUI.	Wildfire	Stillwater County	County Fire Warden	USFS, BLM, DNRC, Fire Chief's Department	Moderate	USFS, BLM, DNRC, County General Fund	Ongoing	Medium	In Progress

#	Action/Project Name & Description	Hazards Mitigated	Jurisdiction	Lead Agency	Partner Agencies	Cost Estimate	Potential Funding	Timeline	Priority	Status
66	Update Stillwater County Community Wildfire Protection Plan.	Wildfire	Stillwater County	County DES	Fire Chief's Department DNRC, USDA, Fire Warden	Moderate	County and City General Funds, HMGP, CDBG	Mid-term	High	In Progress
67	Work with cooperating agencies to develop Population Protection (Evacuation) Plans.	Wildfire	Stillwater County	County Sheriff's Office	Fire Chief's Department, DES,	Moderate	County General Fund	Mid-term	High	Not Started
68	Install dry hydrants and/or water storage tanks in rural parts of county for fire protection.	Wildfire	Stillwater County	County Fire Warden, Fire Chief's Department	DNRC, USDA	Moderate	County General Fund, HMGP, DWSRF	Long-term	Medium	In Progress
69	Reduce the risk of high-intensity wildfire within the Wildland Urban Interface (WUI) as identified in the Stillwater County Community Wildfire Fire Protection Plan.	Wildfire	Stillwater County	County DES	USDA, DNRC	Low	USDA, DNRC	Long-term	Medium	New in 2024

#	Action/Project Name & Description	Hazards Mitigated	Jurisdiction	Lead Agency	Partner Agencies	Cost Estimate	Potential Funding	Timeline	Priority	Status
70	Install HVAC systems that meet air quality system specifications for high dust and ash filtration capacity at all emergency shelters to mitigate volcanic ash risks	Volcanic Ash	Stillwater County, Columbus	County DES	Columbus VFD, Columbus Fire Department	High	FEMA HMA HMGP, BRIC	Long-term	Low	New in 2024

NOTES: Acronyms for lead agency, partners, and funding are defined below:

BLM – Bureau of Land Management

CDBG – Community Development Block Grant Program

CDBG-DR – Community Development Block Grant Disaster Recovery

CISA – Cyber Infrastructure and Security Agency

CWDG – USDA Forest Service's Community Wildfire Defense Grant

DES – Department of Emergency Services

DHS – Department of Homeland Security

DNRC – Department of Natural Resources and Conservation

DPHHS – Department of Public Health and Human Services

DOJ – Department of Justice

DWSRF – EPA's Drinking Water State Revolving Fund

EMPG – FEMA's Emergency Management Performance Grant Program

EMS – Emergency Medical Services

FEMA – Federal Emergency Management Agency

FMA – FEMA's Flood Mitigation Assistance Grant Program

GIS – Geographic Information Systems

HMGP – FEMA's Hazard Mitigation Grant Program

HSGP – Homeland Security Grant Program

ICS – Industrial Control Systems

IT – Internet Technology

MATIC – Montana Analysis and Technical Information Center

MHP – Montana Highway Patrol

MSU – Montana State University

SLCGP – CISA State and Local Cybersecurity Grant Program

USDA – US Department of Agriculture

WUI – Wildland-Urban Interface

SECTION 6. PLAN MAINTENANCE PROCEDURES

The Plan maintenance section details the formal process that will ensure that the Stillwater County MHMP remains an active and relevant document. The maintenance process includes a schedule for monitoring and evaluating the Plan and producing a Plan revision every five years. The Plan can be revised more frequently than five years if the conditions under which it was developed change significantly (e.g. a major disaster occurs, and projects are accomplished, and/or new projects need to be identified, or funding availability changes). This section also describes how Stillwater County will monitor the progress of mitigation activities and how the Plan will be incorporated into existing planning mechanisms. The final section describes how Stillwater County will integrate public participation throughout the Plan maintenance process.

6.1 Monitoring, Evaluating and Updating the Plan

Evaluation of the MHMP consists of an assessment of whether the planning process and actions have been effective and whether changes are needed. The review should determine whether the hazards profiled remain relevant and what new hazards may affect the area, whether new vulnerabilities have emerged, whether capabilities have changed to support mitigation, and whether the Plan goals are being reached. Plan updates typically occur every five years but can take place more frequently, if needed.

6.1.1 2015 PDM Plan

The 2015 Stillwater County PDM Plan indicated that the Plan would be reviewed annually at meetings of the LEPC. These reviews could be more or less frequent, as deemed necessary by the DES Coordinator, but there was to be a minimum of one review per year. The review was to consider any new hazards and/or vulnerabilities to the communities, and to determine whether a Plan update was needed prior to the required five-year update. The DES Coordinator was responsible for ensuring the PDM Plan review was on the agenda at the LEPC meetings and was supposed to prepare a status report summarizing the outcome of the Plan review. The meeting minutes were to be kept in a permanent file designated for the next Plan update.

According to the MHMP Planning Team, sections of the 2015 Stillwater County PDM Plan were reviewed periodically at LEPC meetings; however, meeting notes did not document these discussions. Consequently, no information exists about monitoring or evaluating the 2015 PDM Plan.

In 2018, Stillwater County was one of eight counties who went together on a FEMA planning grant application to complete their MHMP update. This project was funded and subsequently Tetra Tech was hired to complete the project.

6.1.2 2024 revised MHMP

The 2024 revised MHMP will be reviewed at meetings of the LEPC. The LEPC membership includes many of the MHMP Planning Team members who will bring insight to the group on Plan development. The Plan will be reviewed twice a year by the LEPC who will consider any new hazards and/or vulnerabilities in the county, as well as identify any new mitigation projects which should be added to the Plan. The review should determine whether a plan update is needed prior to the required five-year update.

The Stillwater County DES Coordinator will be responsible for ensuring the annual MHMP review is on the agenda at the LEPC meetings. The DES Coordinator will document the meeting by preparing a status report summarizing the outcome of the Plan review. Meeting notes will be posted on the county website and/or otherwise made available to interested stakeholders.

The MHMP will also be evaluated and revised following any major disasters, to determine if the recommended actions remain relevant and appropriate. The risk assessment will also be revisited to see if any changes are necessary based on the pattern of disaster damages. This is an opportunity to increase the community's disaster resistance and build a better and stronger community.

The Stillwater County DES Coordinator will be responsible for the Plan update. Before the end of the five-year period, the updated Plan will be submitted to FEMA for approval. When concurrence is received that the updated Plan complies with FEMA requirements, it will be submitted to the Stillwater County Commissioners and the Columbus City Council for adoption. The DES Coordinator will send an e-mail to individuals and organizations on the stakeholder list to inform them that the updated Plan is available on the county website.

6.2 Monitoring Progress of Mitigation Activities

The process for monitoring and evaluating mitigation projects will be the responsibility of the LEPC, an organization comprised of local officials from Stillwater County, Columbus, emergency response entities, local businesses, and non-profit organizations who meet on a regular basis. The following sections describe monitoring actions over the past five years and an updated strategy going forward.

6.2.1 2015 PDM Plan

The 2015 Stillwater County PDM Plan indicated that the mitigation strategy would be reviewed annually at meetings of the LEPC. The mitigation strategy review was to document completed mitigation projects, identify new mitigation projects and evaluate mitigation priorities. Agencies and organizations "assigned" responsibility for various aspects of the mitigation strategy were supposed to have the opportunity to coordinate with other team members on challenges, success and opportunities. Minutes were supposed to be prepared from these meeting and kept in a permanent file for the next Plan update.

According to the MHMP Planning Team, mitigation projects from the 2015 Stillwater County PDM Plan were reviewed by various entities over the past eight years; i.e. wildfire projects were reviewed by the Fire Council, and flood projects were reviewed by the Stillwater County Road Dept./Columbus Public Works. Meeting notes were not prepared to document these discussions. Consequently, no information exists about monitoring and evaluation of the mitigation strategy.

Since development of the 2015 PDM Plan, several mitigation projects were completed in Stillwater County (see *Section 5.1*) while a number of other projects are on-going and will continue through the next planning period.

6.2.2 2024 revised MHMP

Going forward, the LEPC will review the mitigation goals, objectives, and actions to ensure progress is being made. They will evaluate the feasibility of the mitigation projects, monitor resources, budgets, and schedules, and document project completion, at a minimum, twice a year. This group will provide a venue for reporting and accountability. Most MHMP Planning Team members are part of the LEPC. The Stillwater County DES Coordinator will coordinate these meetings and be responsible for taking notes, posting them on the county website, and maintaining a permanent file for the next (2026) MHMP update.

At the semi-annual meetings to monitor and evaluate mitigation projects, the LEPC will review:

- Any grant applications filed on behalf of any of the participating jurisdictions.
- Hazard events and losses occurring in the various jurisdictions.
- Progress on implementing mitigation actions, including efforts to obtain outside funding.
- Obstacles or impediments to project implementation.
- Additional mitigation actions believed to be appropriate and feasible.
- Public and stakeholder input.

A mitigation action plan has been developed for each project in this Plan. Each agency or department listed as a "responsible entity" should receive a copy of the mitigation strategy assigned to them and record progress and developments towards implementation. During the LEPC meetings where project status is reviewed, each agency/dept. will provide an update of projects under their purview and can coordinate with the LEPC on challenges, successes, and opportunities. Mitigation project evaluations will assess whether:

- Goals and objectives address current and expected conditions.
- The nature or magnitude of the risks has changed.
- Current resources are appropriate for implementing the MHMP and if different or additional resources are now available.
- Actions were cost effective.
- Schedules and budgets are feasible.
- Implementation problems, such as technical, political, legal or coordination issues with other agencies are presents.
- Outcomes have occurred as expected.
- New agencies/departments/staff should be included.

As a full-time, federally-funded position, the DES Coordinator has the capacity to administer the county's mitigation program. Responsibility for securing mitigation grants will be shared with various county departments and the City of Columbus as follows:

- Flood projects will be managed by the County Road Dept.
- Wildfire fuels projects will be managed by the City Fire Dept.
- Drought projects will be managed by the County Extension Agent/Conservation District.
- Communicable Disease projects will be managed by County Public or Environmental Health.
- Severe Weather and All Hazard projects will be managed by County DES.
- The City of Columbus will manage city grants and mitigation projects through the mayor's office with assistance from the Clerk-Treasurer and various departments, as needed.

The DES coordinator will track all mitigation grants through a central database and assist other county and city departments, as needed, with quarterly reports and financial reporting.

Stillwater County may want to consider measuring their mitigation success by participating in the STAR Community Rating System. Local leaders can use the STAR Community System to assess how sustainable they are, set goals for moving ahead and measure progress along the way. More information: http://starcommunities.org/get-started.

FEMA's Grants Management Technical Assistance program launched the *Grants Management Digital Resource Center* to provide information and resources to support the grant management lifecycle. Tools have been created to highlight documentation management and retention practices for non-federal entities who receive federal financial assistance from FEMA. Stillwater County may want to consider utilizing these tools to assist with grant management.

FEMA has a project *Closeout Toolkit* for HMGP sub-award closeouts. Subaward closeout is the process by which the recipient and FEMA verify that a subaward scope of work has been completed as approved and that all reimbursed costs were eligible. The recipient has primary responsibility for the closeout tasks associated with both the program and subrecipient requirements. The recipient must conduct final inspections for projects, reconcile subrecipient expenditures, resolve negative audit findings, obtain final reports from subrecipients, and reconcile the closeout activities of subrecipients with HMGP grant award requirements. These activities must all be done within the grant's period of performance.

6.3 Implementation through Existing Programs

Stillwater County will have the opportunity to implement hazard mitigation projects through existing programs and procedures through plan revisions or amendments. The MHMP will be incorporated into the plans, regulations and ordinances as they are updated in the future or when new plans are developed. **Table 6.3-1** presents a summary of existing plans and ordinances and how integration of mitigation projects will occur.

Table 6.3-1. Implementation of Mitigation into Existing Plans and Codes

Type	Name	Integration Technique
Plans		
Emergency Operations	Stillwater County Emergency Operations Plan	Integrated by reference in MHMP.
Growth Policies	Stillwater County Growth Policy	Integration of mitigation strategies will occur when growth policies are revised.
	City of Columbus Growth Policy	
Wildfire Mitigation	Stillwater County Community Wildfire Protection Plan	Wildfire mitigation projects will be incorporated when plan is revised.
Flooding	Stillwater County Flood Insurance Study	Integration of mitigation plan will occur, as appropriate, when study is revised.
Capital Improvement Plan	Stillwater County Capital Improvement Plan	Integration of mitigation plan will occur when CIP is revised.
Codes, Regulations & Ordinances		
Zoning	City of Columbus Zoning Regulations	Mitigation plan will be incorporated into revisions of zoning ordinances.
Subdivisions	Stillwater County Subdivision Regulations	Mitigation plan will be incorporated into revisions of subdivision regulations.
	City of Columbus Subdivision Regulations	
Floodplain	Stillwater County Floodplain Regulations	Mitigation plan will be incorporated into revisions of floodplain regulations.
	City of Columbus Floodplain Regulations	

A summary of how the MHMP can be integrated into the legal framework is presented below:

- Partner with other organizations and agencies with similar goals to promote building codes that are more disaster resistant on the State level.
- Develop incentives for local governments, citizens, and businesses to pursue hazard mitigation projects.
- Allocate County resources and assistance for mitigation projects.
- Partner with other organizations and agencies in central Montana to support hazard mitigation activities.

Stillwater County and the City of Columbus use a growth policy to guide development. Typically, a growth policy will address hazards; specifically, that life and property be protected from natural disasters and man-caused hazards. Mitigation goals in the MHMP will be recommended for incorporation into future revisions of these growth policies to ensure that high-hazard areas are being considered for low risk uses.

To ensure that the requirements of the MHMP are incorporated into other planning mechanisms and remain an on-going concern in Stillwater County, job descriptions of various staff will be enhanced to include a mitigation component. Job descriptions for the County Planner, Floodplain Administrator, and Road Department supervisor will be updated to include involvement in the LEPC. Participation in this group will provide an awareness of new and on-going mitigation initiatives for the purpose that they be integrated into plans, codes and regulations during revision. The job description of the DES Coordinator will include responsibilities for implementing outreach activities for risk reduction in the county, coordinating with the Board of County Commissioners to secure funding for mitigation projects, mitigation project implementation, scheduling the annual LEPC meetings to review the MHMP, and updating the MHMP. The DES Coordinator will also be responsible for maintaining a permanent file for the MHMP planning process, which will include damage figures from hazard events, records of mitigation projects, and notes/minutes from relevant meetings.

Meetings of the Board of County Commissioners and City Council will provide an opportunity for Stillwater County DES to report back on the progress made on the integration of mitigation planning elements into planning documents and procedures for the County and Columbus.

6.4 Continued Public Involvement

Stillwater County is dedicated to involving the public directly in review and updates of the MHMP. The public will have many opportunities to provide feedback about the plan. Hard copies of the plan will be kept at appropriate county and city offices. An electronic copy of the plan will be available on the Stillwater County website. The existence and location of plan hard copies will be publicized on the county website. *Section 2.0* includes the address and the phone number of Stillwater County DES who will be responsible for keeping track of public comments on the plan.

The public will be invited to meetings of the LEPC when the MHMP is discussed. The meetings will provide the public a forum for which they can express concerns, opinions, or ideas about the plan. The DES Coordinator will be responsible for using county resources to publicize the public meetings and maintain public involvement through print, broadcast and/or social media.

The MHMP Planning Team will continually observe the processes for public outreach. By monitoring these activities, the Planning Team will then be able to evaluate them at the time of the plan update and determine if any changes are needed.

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