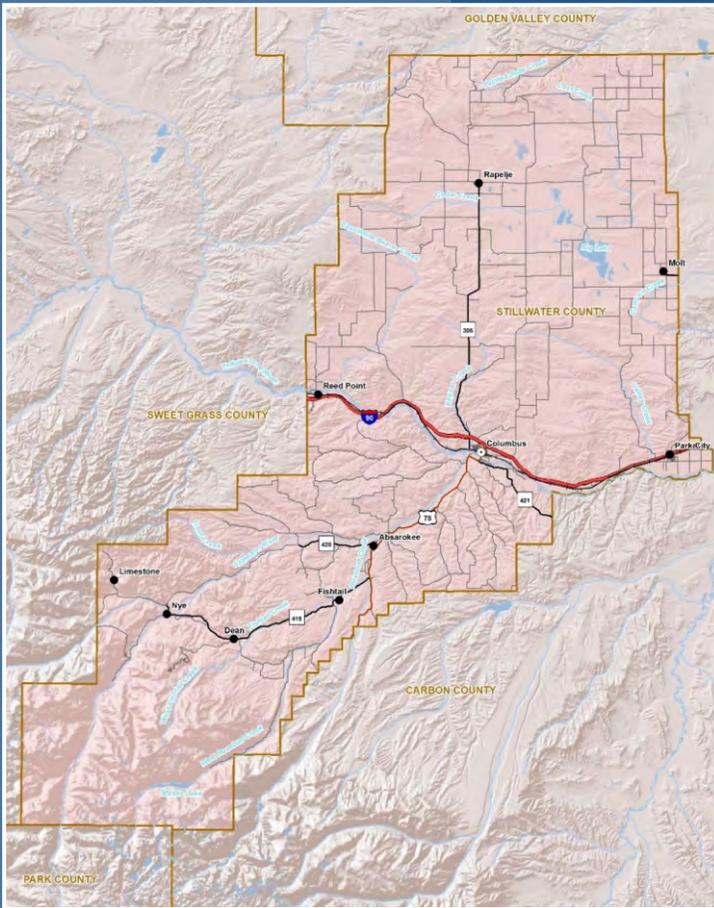


2015 Update to Pre-Disaster Mitigation Plan

Stillwater County and Town of Columbus Montana



October 2015



**2015 UPDATE TO
PRE-DISASTER MITIGATION PLAN**

FOR

**STILLWATER COUNTY MONTANA
AND
TOWN OF COLUMBUS**

Prepared for:

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October 2015

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LIST OF ACRONYMS

BLM	Bureau of Land Management
BNSF	Burlington Northern-Santa Fe Railroad
CDBG	Community Development Block Grant
CDP	Census Designated Place
CEIC	Census and Economic Information Center
cfs	Cubic Feet Per Second
CPRI	Calculated Priority Risk Index
CRP	Conservation Reserve Program
CRS	Community Rating System
CWPP	Community Wildfire Protection Plan
DEM	Digital Elevation Model
DES	Disaster and Emergency Services
DFIRM	Digital Flood Insurance Rate Map
DMA	Department of Military Affairs
DMA	Disaster Mitigation Act
DNRC	MT Department of Natural Resources and Conservation
DOI	U.S. Department of Interior
DPHHS	Montana Department of Health and Human Services
EAP	Emergency Action Plan
EMT	Emergency Medical Technician
EOC	Emergency Operations Center
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right to Know Act
FAA	Federal Aviation Administration
FEI	Fire Effects Index
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FIRM	Flood Insurance Rate Map
FMA	Flood Mitigation Assistance
FRI	Fire Risk Index
FTI	Fire Threat Index
FWS	U.S. Fish and Wildlife Service
GIS	Geographic Information Systems
HMGP	Hazard Mitigation Grants Program
IBC	International Building Code
LEPC	Local Emergency Planning Committee
LOMR	Letter of Map Revision
MDOR	Montana Department of Revenue
MDT	Montana Department of Transportation
NCDC	National Climatic Data Center
NDMC	National Drought Mitigation Center



LIST OF ACRONYMS

NFIP	National Flood Insurance Program
NID	National Inventory of Dams
NFPA	National Fire Protection Association
NOAA	National Oceanic and Atmospheric Administration
NRC	National Response Center
NRCS	Natural Resource Conservation Service
NRIS	Natural Resource Information System
NTSB	National Transportation Safety Board
NWS	National Weather Service
PDM	Pre-Disaster Mitigation
PDMC	Pre-Disaster Mitigation Competitive (grants program)
RC&D	Resource Conservation and Development
RFA	Rural Fire Assistance
Risk MAP	Risk, Mapping, Assessment, and Planning
SHELDUS	Spatial Hazard Events and Losses Database for the United States
SCOEDP	Stillwater County Overall Economic Development Plan
STD	Sexually Transmitted Disease
TRI	Toxic Release Inventory
USDA	United State Department of Agriculture
USFS	United States Forest Service
USGS	United States Geologic Survey
WHO	World Health Organization
WUI	Wildland Urban Interface

SECTION 1. INTRODUCTION

1.1 Background

In response to the requirements of the Disaster Mitigation Act of 2000 (DMA 2000), Stillwater County, and the Town of Columbus, have developed this Multi-Jurisdictional Pre-Disaster Mitigation (PDM) Plan. 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 pre-disaster mitigation planning and develop PDM Plans. The Federal Emergency Management Agency (FEMA) has issued guidelines for development of PDM Plans. 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 PDM Plan in 2010 to help guide and focus hazard mitigation activities. The County, working together with Tetra Tech Inc., has prepared this update to their PDM Plan update to satisfy the requirement that PDM Plans be updated every five years. The updated Stillwater County PDM Plan profiles significant hazards to the community and identifies mitigation projects that can reduce those impacts. The purpose of the updated PDM Plan 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 PDM Plan includes resources and information to assist residents, organizations, local government, and others interested in participating in planning for natural and man-made hazards. This 2015 updated PDM Plan supersedes the 2010 PDM Plan.

1.2 Authority

The Stillwater County PDM Plan update 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 June of 2008 for Multi-Jurisdictional Mitigation Planning.

The Stillwater County Board of County Commissioners has adopted this PDM 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 as **Appendix A** to this plan. The PDM Plan 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 PDM Plan 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 development of the Stillwater County PDM Plan. Stillwater County Disaster and Emergency Services (DES) provided support for all aspects of plan development including providing digital locations and insurance values for the critical facilities and infrastructure used in the PDM analysis. The PDM Planning Team, comprised of members of the Local Emergency Planning Committee (LEPC), met on a regular basis to guide the project, identify the hazards most threatening to the County, develop and prioritize mitigation projects, review draft deliverables and attend the public meetings. The local communities participated in the planning process by attending public meetings and contributed to plan development by reviewing and commenting on the draft plan.

1.4 Scope and Plan Organization

The process followed to prepare the Stillwater County PDM Plan update included the following:

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

The PDM Plan 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 updated Stillwater County PDM Plan 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 planning effort was facilitated by the contractor, Tetra Tech. Public participation played a key role in 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 agencies that support activities in the County, neighboring communities and local partners.

2.1 PDM Planning Team

The Stillwater County DES Coordinator requested the LEPC serve as the PDM Planning Team for the purposes of updating the PDM Plan. These individuals are listed in **Appendix B**. The affiliation of these participants are presented in **Table 2.1-1**.

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

Organization / Position	Type of Organization
Stillwater County / DES Coordinator	County Emergency Management
Stillwater County/ Sheriff	County Law Enforcement
Stillwater County / Road & Bridge Shop	County Infrastructure
Stillwater County / Commissioner	County Government
Stillwater County / Extension	County Extension
Columbus-Stillwater County / Floodplain Administrator	County Government
Columbus-Stillwater County / Planning Board	City-County Planning
Columbus-Stillwater County / Rural Fire Department	County-City Emergency Response
Town of Columbus / Clerk	Town Government
Town of Columbus / Deputy Clerk	Town Government
Town of Columbus / Police Department	City Law Enforcement
Montana DES / Regional Coordinator	State Emergency Management

Responsibilities of the Planning Team included attending conference calls to discuss update of the Plan, providing data for analysis in the risk assessment, attending public meetings, providing input and feedback on mitigation strategies, review of the draft plan document, and supporting the plan throughout the adoption process. The PDM Planning Team will assist the Stillwater County DES Coordinator in updating the Plan in the future.

Conference calls were held with the Planning Team while the plan was being drafted. In advance of each meeting, an agenda and/or materials to be discussed (i.e. example mitigation strategies, examples of projects eligible for FEMA funding, etc.) were sent to meeting participants. Conference call minutes are presented in **Appendix B**.

During the initial conference call and first public meeting, the Planning Team and other meeting participants reviewed and analyzed each section of the 2010 PDM plan, as described in **Table 2.1-2**.

Table 2.1-2. Review and Analysis of 2010 PDM Plan

2010 PDM Sections	How Reviewed and Analyzed
Section 1 – Introduction	Reviewed existing section through discussion at public meeting. No analysis needed.
Section 2 - Planning Process	Reviewed and analyzed existing section through discussion at public meeting. Planning process expanded by utilizing project website and scoring hazards using Calculated Priority Risk Index.
Section 3 – Hazard Evaluation and Assessment	Reviewed and analyzed existing section through discussion during public meeting and Planning Team conference calls. Reviewed and updated hazards, critical facilities and vulnerable populations. Updated sections with recent hazard data.
Section 4 - Mitigation Strategy	Reviewed by Planning Team during conference calls, public meeting and subsequent mitigation workshop. New projects developed, existing projects re-worded and/or deleted, completed projects documented.
Section 5 - Plan Maintenance Procedures	Reviewed and analyzed existing section through discussion during Planning Team conference calls. Determined that plan maintenance procedures outlined in previous plan had not been implemented.

2.2 Project Stakeholders

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

On the County level, project stakeholders included the County Commissioners, the Emergency Manager, Floodplain Coordinator, Extension Office personnel, Planning Board Members, Rural Fire Districts, Sewer Districts, Law Enforcement personnel, Chamber of Commerce, Facility Supervisor, Superintendent of Schools, Road & Bridge Department, Economic Development, Environmental Health and County Attorney. These entities participated in the planning process by either providing data, attending public meetings, and/or reviewing the draft PDM Plan.

Stakeholders from the Town of Columbus included: the Mayor, Town Council members, Public Works, Planning Board, and Police and Fire Departments. These entities participated in the planning process by either providing data, attending public meetings, and/or reviewing the draft PDM Plan.

Stakeholders from federal agencies included representatives from: the National Weather Service (NWS), Beartooth Resource Conservation and Development (RC&D), Natural Resources Conservation Service (NRCS), U.S. Fish & Wildlife Service, U.S. Forest Service, and Bureau of Land Management (BLM). These agencies were provided information on plan development, attended public meetings, and/or reviewed the draft PDM Plan.

Stakeholders from state agencies included representatives from: the Montana Department of Natural Resources and Conservation (DNRC), Department of Transportation, the District Representative from the Montana DES, State Hazard Mitigation Officer. These entities participated in the planning process by providing data for the plan, attending the public meetings and/or reviewing the draft PDM Plan.

Non-governmental stakeholders including non-profits, utilities, the railroad, medical facilities, and other businesses in the community consisted of: American Red Cross, Fergus Electric Cooperative, Beartooth Electric Cooperative, Burlington Northern-Santa Fe (BNSF) Railroad, Stillwater Billings Clinic, Stillwater Mining Company, and the Beartooth Manor Nursing Home. Some of these entities provided information for plan development, attended the public meetings and/or, reviewed the draft PDM Plan update.

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

2.3 Review of Existing Plans and Studies

At the initiation of the PDM updating project, planning documents and studies completed for the project area were provided to the contractor to review in order to determine how mitigation could be integrated into this planning process and future local planning mechanisms and programs. Contributing plans/ordinances provided to the contractor included:

DAMS

- Emergency Action Plan, Mystic Lake Dam

EMERGENCY OPERATIONS

- Stillwater County Emergency Operations Plan, 2011

FLOOD STUDIES

- Flood Insurance Study - Stillwater County and Incorporated Areas, 2014
- Flood Risk Report, Stillwater County Montana, Draft, August 31, 2014

GROWTH POLICIES, ORDINANCES, REGULATIONS

- Stillwater County Growth Policy, 2007
- Stillwater County Subdivision Regulations
- Stillwater County Capital Improvement Plan, 2008
- Stillwater County Floodplain Development Regulations
- Columbus Area Growth Policy, 2012
- Columbus Subdivision Regulations
- Columbus Zoning Regulations
- Neighborhood Addendum to the Stillwater County Growth Policy, 2010

HAZARD MITIGATION

- Stillwater County Pre-Disaster Mitigation Plan, 2010
- Stillwater County Community Wildfire Protection Plan, 2006
- Snow Removal Plan, 2014-2015

OTHER

- Stillwater County Overall Economic Development Plan, 2015 Update



The data obtained from the plan and regulation review was incorporated into various sections of the PDM Plan. *Section 4.0* contains reference to the plans and ordinances affecting management of the hazard. *Section 7.3* 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 project stakeholders and the citizens of Stillwater County. The project website can be viewed at: www.countypdm.com/stillwater-county (password: Columbus). The website remained active during the course of the project through adoption of the plan and was linked to the Stillwater County DES website.

The website contained a Home page and pages for: Contacts, Planning Team, Meetings, Draft PDM Plan, Maps, and References. The Home page contained a letter inviting participation in development of the Plan. The Contacts page contained information on Tetra Tech and County personnel involved in management of the project. The Planning Team page contained maps for the Planning Team and other materials for review prior to the conference calls. The Meetings page contained the conference call and public meeting schedule, notes, and PowerPoint presentations from the meetings. The Draft PDM Plan page contained sections from the draft plan for stakeholder review. The References page contained the 2010 Stillwater County PDM Plan, FEMA guidance on preparing multi-jurisdictional hazard mitigation plans, the FEMA Region 8 Plan Review Guidance, and links to the State of Montana PDM Plan and FEMA websites.

2.5 Project Meetings

Two public meetings were conducted during development of the PDM Plan. At the first public meeting, the 2010 plan was reviewed and hazards identified for the 2015 update. At the second public meeting, the results of the risk assessment were reviewed. After the meeting, a workshop was held to review the 2010 mitigation strategy and identify progress made on the various projects. New mitigation projects for the 2015 plan were identified and projects no longer deemed important were deleted from the strategy. Sign-in sheets, presentation materials and meeting notes are contained in **Appendix B** and posted on the project website.

The first public meeting was held on May 27, 2015 at the Stillwater County Courthouse lower level meeting room in Columbus. The meeting was advertised in the May 21st edition of the Stillwater County News newspaper. A meeting notice was sent via e-mail to all project stakeholders and the meeting was posted on the project website and Stillwater County DES Facebook Page. Tetra Tech made a presentation at the meeting which reviewed each section of the 2010 mitigation plan, outlined the background and rationale for updating the PDM Plan, the process and methodology for the plan update, and the project schedule. Draft Hazard Maps were presented for public input. The meeting presentation was placed on the project website for stakeholders who could not attend the meeting (**Appendix B**). Approximately 25 individuals participated in the meeting including representatives from Stillwater County DES, Sheriff's Office, County Attorney's Office, County Extension Office, County Economic Development, County Finance, County Noxious Weed Program, Floodplain Administrator,

County Road & Bridge Department, the County Commissioners, Town of Columbus Fire Department, State DES District Representative, federal partners including the Forest Service and NRCS, business stakeholders including Stillwater Billings Clinic and Beartooth Assisted Living, and a member of the public.

A second public meeting to review the draft PDM Plan was held on September 17th, 2015 at the Fairgrounds Pavilion in Columbus. A notice of the meeting was sent via email to the project stakeholders, advertised in the September 10th, 2015 edition of the Stillwater County News newspaper, posted on the Stillwater County DES Facebook page and listed on the project website. Tetra Tech presented draft results of the risk assessment at the meeting as well as the updated mitigation strategy. 24 individuals attended the public meeting including representatives from Stillwater County DES, County Attorney's Office, County Economic Development, County Clerk and Recorder, Floodplain Administrator, County Road & Bridge Department, the County Commissioners, Town of Columbus Fire Department, State DES District Representative, Stillwater Conservation District, NRCS, Stillwater Billings Clinic, and several members of the public. Public meeting attendees networked before and after the meeting, listened to the presentation, and asked questions.

2.6 Plan Review

The planning process for the PDM Plan began on February 18, 2015 and lasted approximately nine 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. An notice was placed on the Stillwater County DES Facebook page notifying the public of the availability of the draft PDM Plan and that review copies were available in hard copy, electronically on compact disk (CD) upon request, or accessible via the project website. A hard copy of the PDM Plan was available for review at the Stillwater County DES office. An e-mail announcement was sent to the project stakeholders list announcing the availability of the draft PDM Plan for review with instructions on how to comment.

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 office after a 30-day review period. Stillwater County DES reviewed the comments and in consultation with the Planning Team submitted a consolidated list of comments to the contractor. Comments were incorporated into a final draft document. The final draft PDM Plan was submitted to the State Hazard Mitigation Officer and FEMA for compliance with the Region 8 Plan Review Guidance. Comments received from Montana DES and the FEMA were addressed in the final plan document that the County and Town of Columbus adopted.

At this point a second opportunity was provided to the public to comment on the PDM Plan. The final plan was posted on the project website and stakeholders were notified of its availability via an e-mail message. Final comments were addressed in a second plan revision and the final plan was provided to the Stillwater County Commissioners and the incorporated community of Columbus for adoption. After adoption, final copies of the plan were submitted to the Montana DES and FEMA.

Future comments on the PDM Plan should be addressed to:

Stillwater County Disaster and Emergency Services
P.O. Box 1287, Columbus, MT 59019
406-322-8060

SECTION 3. COMMUNITY PROFILE

This section of the PDM Plan presents an overview of Stillwater County and the Town of Columbus, the jurisdictions which comprise this plan. Information is provided on the characteristics of the county, the economy and land use patterns, and presents the backdrop for this mitigation planning process.

3.1 Physical Setting

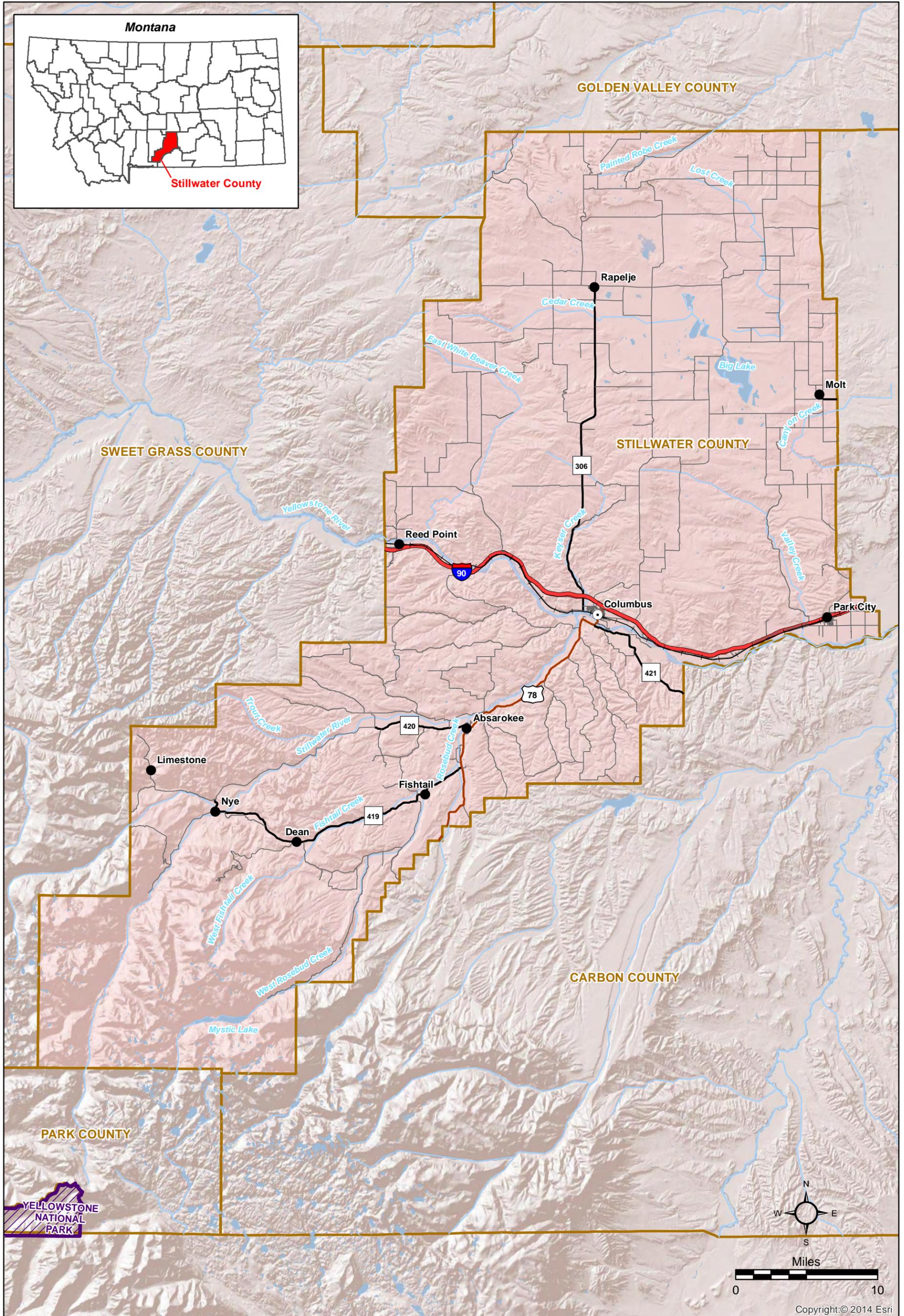
Stillwater County is located in south-central Montana and consists of 1,793 square miles with geographic features that range from the Beartooth Mountains at the southern end of the county, to the Stillwater and Yellowstone River Valleys in the central section, to the lake basins and coulees at the northern end. Columbus is the county seat and the only incorporated community in the County. Unincorporated communities include Absarokee, Fishtail, Molt, Nye, Park City, Rapelje, and Reed Point.

Stillwater County is bounded by Sweetgrass County on the east, Yellowstone County on the west, Carbon and Park Counties on the south, and Golden Valley County on the north. **Figure 1** presents a location map of Stillwater County. The physical setting narrative below is from the Stillwater County Growth Policy (2007).

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 ten 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.

Most of Stillwater County is drained by the Yellowstone River except Big Coulee Creek and Painted Robe Creek in the northern part of the county, which drain into the Musselshell River. 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. 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, Flaherety 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



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August 2015

Figure 1

Location Map
Stillwater County

Pre-Disaster Mitigation Plan



Legend

- County Seat
- Place Name
- Interstate
- Primary Route
- Secondary Route
- Other Route
- Railroad
- Lake/Reservoir
- River/Stream
- National Park
- County

erosion than sandstone and forms steep sandstone cliffs at various locations. Examples of the eroded uplands topography are located in northern Stillwater County and the central part of the county along the Yellowstone and Stillwater River valleys.

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. This 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. Stillwater Mining Company, has been mining platinum group metals in the Stillwater Complex since 1986. The Company conducts mining operations at its Stillwater and East Boulder mines in southern Montana. Concentrating plants are located at both mines to upgrade ore to a concentrate. The Company operates a smelter, refinery and laboratory at Columbus.

Private land in Stillwater County accounts for 77.7 percent of the total. Other lands in Stillwater 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.

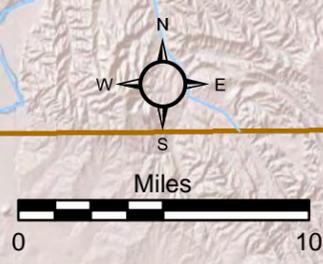
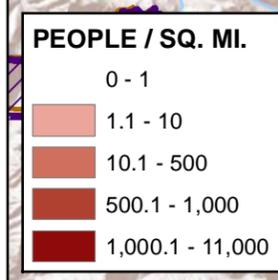
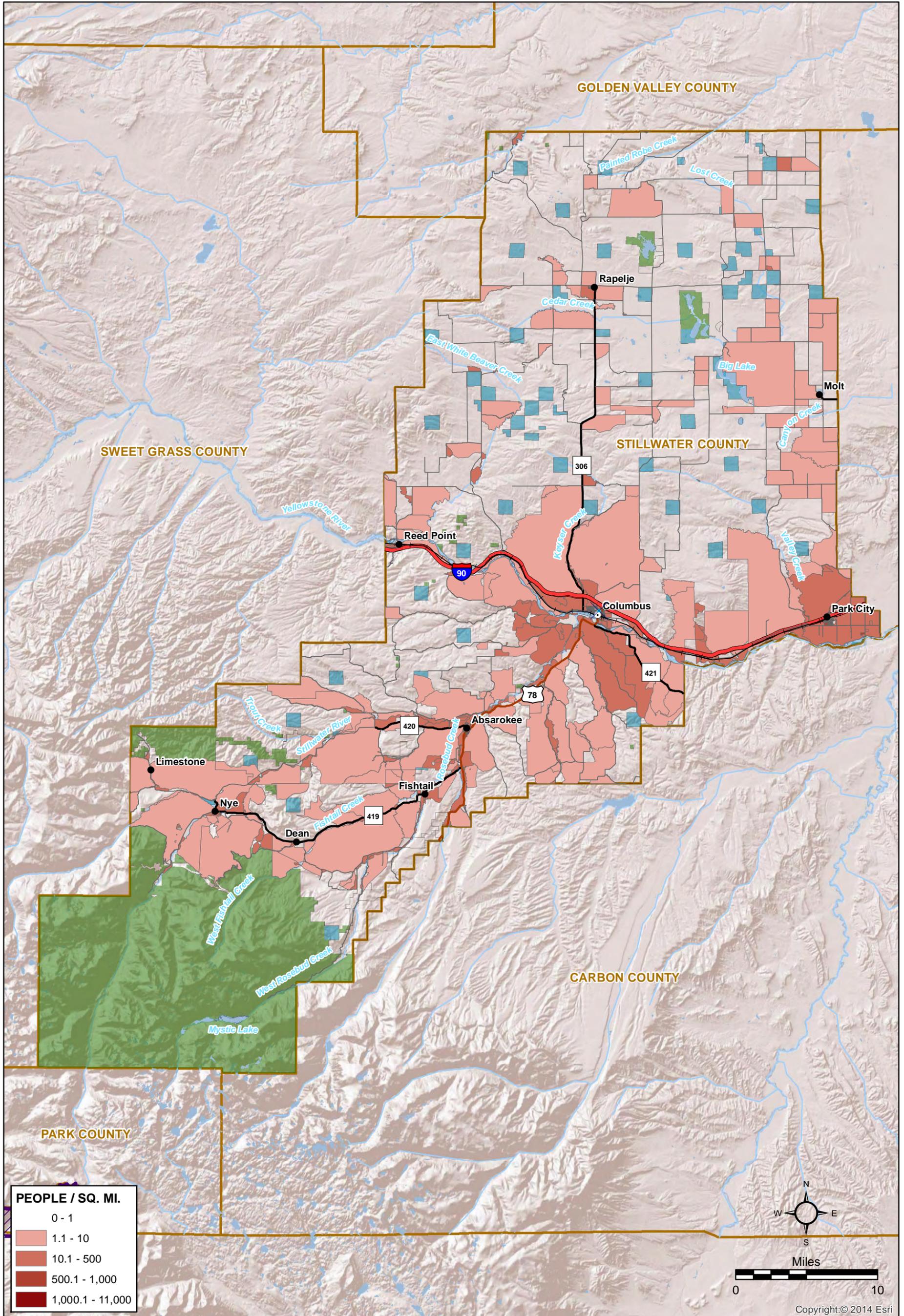
The State of Montana manages a 4.2 percent of the acreage within Stillwater County. Lands managed by the Department of Natural Resources and Conservation (DNRC) Trust Lands Management Division account for 45,449 acres, and Montana Fish, Wildlife and Parks manage 2,681 acres.

Population density in Stillwater County is 5.1 persons per square mile compared to the average 6.8 persons per square mile for the State of Montana (Census Quick Facts, 2015). **Figure 2** presents landownership and population density in Stillwater County.

3.2 Climate

Stillwater County is located in a climatic region described as semiarid, which is characterized by colder temperatures. The general weather of the area consists of cold, dry winters; cool, moist springs; hot, moderately dry summers; and cool, dry autumns. The Stillwater County Growth Policy (2007) provides the following description of climate in the county.

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 runoff from melting mountain snowpack during the spring and early summer combined with heavy rains causes occasional flooding of some streams and rivers.



- Legend**
- | | | | |
|-------------|-----------------|----------------|---------------|
| County Seat | Interstate | Railroad | National Park |
| Place Name | Primary Route | Lake/Reservoir | County |
| State | Secondary Route | River/Stream | |
| Federal | Other Route | | |
| Private | | | |

August 2015
Figure 2
 Land Ownership and Population Density
 Stillwater County
Pre-Disaster Mitigation Plan

Stillwater County is located in a belt of westerly winds. The mountains of the Pacific Northwest and the Rockies receive most of the moisture before it reaches here. 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. 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 degrees 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. The number of frost free days ranges from less than 50 days in the mountains to over 130 days in the Yellowstone River valley.

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 constitute 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.

Table 3.2-1 presents climate statistics for Columbus. 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 also records weather and climatic data. Further information on NWS weather warning criteria is presented in the individual hazard profiles in *Section 4.0*.

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)	0.55	0.63	1.06	1.89	2.72	2.2	1.22	0.91	1.22	1.3	0.63	0.55
Average Snowfall (Inches)	7	7	8	3	2	0	0	0	1	3	4	8

Source: <http://www.usclimatedata.com/climate/columbus/montana/united-states/usmt0072>

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: the 911 emergency call center, emergency operations centers, police and fire stations, public works facilities, sewer and water facilities, hospitals and shelters; and facilities that, if damaged, could cause serious secondary impacts (i.e., hazardous material facilities). 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 jail, law enforcement center, public services buildings, senior centers, community corrections center, the courthouse, and juvenile services building and other public facilities such as hospitals, nursing homes and schools.

Critical facilities in Stillwater County are identified in **Appendix C**. Replacement values were collected where readily available; however, time and resource constraints prohibited the collection of values for all structures. A GIS layer of the critical facilities was used in the hazard risk assessment. This GIS layer should be updated on a regular basis for use in future analysis. Further details on the county's critical facilities and infrastructure from the Stillwater County Growth Policy (2007) and Stillwater County Overall Economic Development Plan (2015) are presented below.

3.3.1 Water and Wastewater Services

Absarokee, Columbus and Rapelje presently have central water systems. These systems are supplied with water by wells and springs and the water is then stored in tanks and cisterns. More than 1,480 people or greater than 16 percent of the County's population is being served by these community water systems. The remaining population are served by individual water systems such as wells, springs or cisterns.

Absarokee, Columbus, Park City and Reed Point currently have public sewer systems. These systems generally use a wastewater treatment plant and lagoon treatment systems and some discharge into area waterways. Similar to water, sewer services are provided through underground pipelines and lift stations. Over 3,600 people or about 40 percent of the County's population living in both the incorporated town of Columbus and unincorporated areas of the County are being served by 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. They are 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 most 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 all the way from Rapelje to Nye and Fishtail area. Northwestern Energy serves Absarokee, Columbus, Reed Point, Park City, Stillwater Mine and some of the rural areas along with the other electric providers. 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

The transportation infrastructure within Stillwater County includes the road, rail, and air networks. Information from the County Growth Policy (2007) describes the transportation network.

Interstate System

Interstate 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 Interstate 90 ranges from is approximately 8,710. Approximately 20 percent of the traffic is commercial truck traffic.

State Highways

State highways in Stillwater County are summarized below:

- Old U.S. 10 is an east-west route between Park City and the Springtime Interchange. This highway now serves as a frontage road to I-90 and a minor collector to central Stillwater County. Old U.S. 10 is maintained by the MDT and is the main street (Pike Avenue) for the Columbus Business District. This route parallels the Yellowstone River and has historical and scenic features as the original Yellowstone route. Old U.S. 10 is a two lane paved road.
- Highway 78, between Columbus and Red Lodge, is a primary highway maintained by MDT. This is a paved two lane road which serves as the arterial north-south route in southern Stillwater County. This highway also serves as the main street for the Absarokee business district.
- Highway 302, east of Molt, is a major collector maintained by the State. This is a paved two lane road which serves Molt and northern Stillwater County.
- Highway 306, between Columbus and Rapelje, is maintained by the State. It is a paved two lane road.
- Highway 306, between Columbus and Rapelje, serves as a school bus route and major north-south collector for northern Stillwater County.
- Highway 419, between the junction with Highway 78 south of Absarokee and Nye is one of two east-west major collectors in southern Stillwater County which accesses the mining region. This section of highway extends beyond the Stillwater Mine in Nye. It is a paved two lane road and one of two east-west major collectors in southern Stillwater County which accesses the mining region. This route also serves as Main Street for Fishtail, Dean and Nye.
- Highway 420 is the other east-west major collector in southern Stillwater County. The first seven miles of this route west of Absarokee are paved, two lane and maintained by the State. The remaining 12 miles have a gravel surface. This route is becoming increasingly important as access to the mining region in southern Stillwater County.
- Highway 421, between Columbus and Joliet, is a major collector in east-central Stillwater County. This highway is a paved two lane road maintained by MDT.

Bridges

There are over 30 major bridge structures in the County. The State of Montana maintains the bridge structures on Interstate 90, Highway 10, Rapelje Road 306, Nye Road 419, Stillwater River Road 420 and Joliet Road 421. The Stillwater County Road & Bridge Department is responsible for maintaining bridges on county roads. Over 40 structures are maintained by the County. A few of these have clear span of 20 feet or less. Stillwater County has a proactive bridge improvement program and a long term commitment to capital improvement planning. Many of the smaller wooden bridges are being replaced with culverts.

Railroad

Montana Rail Link 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. Due to the increase of coal production in Montana and the Bakken oil boom in the late 2000's, Stillwater County sees on average 17.8 Montana Rail Link trains and 2 local trains passing through the county daily according to Montana Rail Link. Passenger rail services were discontinued in Stillwater County in the 1980's.

Airports

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 Pipelines

The County is traversed by high pressure natural gas transmission lines and oil pipelines. A 16 inch oil pipeline was constructed across the northern part of the county in 1995 to transport crude oil to refineries in the Billings/Laurel area. There are gathering lines in the Lake Basin area, a compressor station (built in 1974) southwest of Molt and an 8 inch high pressure transmission line from the compressor station to Laurel. A four inch natural gas transmission line is fed from the Lake Basin Fields and is tied into their main gas transmission system. Natural gas is piped to Billings from northern Stillwater County. Express Pipeline Inc. constructed and is currently operating a 24 inch crude oil pipeline extending approximately 43 miles across northern Stillwater County.

3.3.5 Emergency Services

The provision of fire, ambulance, law enforcement, and 911 services are the community services most directly related to the health, safety and welfare of the public. The 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.

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 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. All the departments and districts operate with volunteer firefighters. The County Commissioners have the responsibility of providing rural wildland fire protection to the county. The Commission appoints a County Rural Fire Warden and cooperates with federal and state fire protection agencies. The County Rural Fire Warden supervises any county crews available for wildland fire protection and has responsibility for rural wildland fire protection of those areas not covered by a fire department or district.

In Stillwater County, there are four rural fire districts. The four fire districts include Absarokee, Broadview, Columbus, and Park City. The Broadview district includes an area in the four counties of Stillwater, Yellowstone, Golden Valley, and Musselshell. The vast majority of the calls received from Broadview fire district are responded to by the Billings or Laurel Fire Departments. In addition there are three volunteer fire departments or companies that include the Molt Fire Department, the Nye Company, and the Rapelje Company.

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, Carbon, and Yellowstone 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.

Ambulance Services

There are three ambulance districts in Stillwater County; Columbus, Absarokee and Park City. The Columbus Ambulance Service provides service to all areas within Stillwater County. It operates out of the Columbus Fire Hall and is staffed with volunteer EMTs. The Absarokee Volunteer Ambulance Service relies on volunteer emergency medical technicians (EMTs) and operates from the Absarokee Fire Hall. The Park City Volunteer Ambulance Service has volunteer EMTs and operates from the Park City Ambulance Hall.

3.4 Population Trends

Stillwater County is the 25th most populous in Montana (out of 56 counties) with a population of 9,117, according to the 2010 U.S. Census. The U.S. Census estimates that the 2014 population was 9,290, a 1.9 percent increase since the 2010 census. **Table 3.4-1** illustrates the change in population in Stillwater County compared to the United States and State of Montana.

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
2010	9,117	11.2%	989,415	9.67%	308,745,538	9.71%
2000	8,195	25.4%	902,190	12.91%	281,424,602	13.15%
1990	6,536	16.8%	799,065	1.57%	248,709,873	9.79%
1980	5,598	20.9%	786,690	13.29%	226,542,199	11.43%
1970	4,632	-16.2%	694,409	2.91%	203,302,031	13.37%

Source: Census and Economic Information Center (CEIC), 2015

Table 3.4-2 presents population statistics for the Town of Columbus, the three Census Designated Places (CDPs), and four census blocks in Stillwater County. CDPs represent several of the unincorporated towns (Absarokee, Park City, and Reed Point) while the population within the entire County is spread between the Absarokee, Columbus, Park City, and North Stillwater census tracts. Columbus is the 53rd largest city in Montana, with a population of 1,893.

Table 3.4-2. Stillwater County Population Trends

Town* / Census Designated Place (CDP) / Census Tract	1980	% Change Since Last Census	1990	% Change Since Last Census	2000	% Change Since Last Census	2010	% Change Since Last Census
Absarokee Census Tract	-	-	-	-	2,318	-	2,222	-4.15
Absarokee CDP	-	-	-	-	1,234	-	1,150	-6.8%
Columbus Census Tract	-	-	-	-	3,306	-	3,797	14.9%
Columbus, Town*	1,439	22.7%	1,573	9.3%	1,748	11.1%	1,893	8.3%
North Stillwater Census Tract	-	-	-	-	762	-	767	0.07%
Park City Census Tract	-	-	-	-	1,809	-	2,331	28.6%
Park City CDP	-	-	-	-	870	-	983	13%
Reed Point CDP	-	-	-	-	185	-	193	4.3%

Source: U.S. Census Bureau, 2015. Notes: CDP = Census Designated Place; -- = data not available.

3.5 Housing Stock

The U.S. Census estimates in their *2009-2013 American Community Survey* that Stillwater County had 4,784 housing units with a median value of \$185,900. A further breakdown of the housing units from the census is presented in **Table 3.5-1**. The housing data suggests that over 60 percent of the homes in Stillwater County were constructed after 1970 and 20 percent were built prior to 1939.

The Stillwater County Overall Economic Development Plan (2015) indicates the number of homes in the Park City census block increased by almost 25 percent between 2000 and 2010. During that same period, housing increased in the Columbus, North Stillwater, and Absarokee census tracts by 19.6, 14.3, and 12.5 percent, respectively.

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

Category	Stillwater County	Columbus, Town	Absarokee CDP	Park City CDP	Reed Point CDP
Total Number of Housing Units	4,784	1,894	915	794	290
Median Value of Housing Units (2009-2013)	\$185,900	\$196,800	\$166,200	\$170,200	\$179,500
Year Structure Built					
2010 or later	54	22	0	6	21
2000 to 2009	912	451	100	170	59
1990 to 1999	798	334	158	112	62
1980 to 1989	542	248	114	105	22
1970 to 1979	620	174	92	199	15
1960 to 1969	285	43	59	65	26
1950 to 1959	297	135	68	25	3
1940 to 1949	353	145	109	28	11
1939 or earlier	923	342	215	84	71

3.6 Economy and Socioeconomics

Commercial trade, manufacturing, precious metals processing, and tourism are the economic base of the Stillwater County. The Stillwater Mining Company, headquartered in Columbus, is one of the world’s leading producers of platinum group metals and the only significant producer of palladium in the U.S. Columbus, the county seat, serves as a shipping center for surrounding farm and ranch lands. 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, which is known for its abundance of waterfowl and migratory birds (MT Dept. Labor, 2012).

The top private employers in 2013 in Stillwater County reported by the Montana Department of Labor and Industry are: Stillwater Mining Company (over 1,000 employees), Montana Silversmiths (100-249 employees), and Town Pump, Special K Ranch, Columbus IGA Plus, and Stillwater Billings Clinic (50-99 employees).

The total civilian labor force has been steadily increasing since mid-2012. Due to the economic recession of the 2000s, many large companies had to downsize, including Timberweld Manufacturing, Montana Silversmiths, and Stillwater Mining Company. After the recession subsided around 2010 most businesses have begun to ramp up their work force once again. Columbus has seen a spike in small business startups since 2010 and continues to have an incredibly vibrant business community.

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.

Table 3.6.1 presents economic indicators for the County and Town of Columbus, from 2008 to 2012.

Table 3.6-1. Economic & Socioeconomic Data; Stillwater County

Indicator	State of Montana	Stillwater County	Columbus
Per capita income (2008-2012)	\$25,002	\$28,868	\$24,438
Median household income (2008-2012)	\$45,456	\$57,906	\$48,167
Persons living below poverty level (2008-2012)	14.8%	7.8%	7.0%
Total Number of Firms (2007)	114,398	1,009	N/A

Source: U.S. Census Bureau, 2015, Quick Facts and 2008-2012 American Community Survey; "--" = not available

3.7 Land Use and Future Development

There is a diversity of land ownership and use in Stillwater County. Statistics in the Stillwater County Overall Economic Development Plan (2015), indicate that approximately 79 percent of land in the County is in private ownership and the remaining 21 percent is publicly owned. Approximately 69 percent of the land area within the County has been classified agricultural and another 6 percent has been classified as private timberland. Federal lands include 17 percent of the land area within the County and state owned lands account for another 4 percent. The remaining 4 percent of the land area includes tract land, commercial tracts, town sites, exempt properties and other unclassified lands.

Approximately 69 percent of the County is classified agricultural including grazing, non-irrigated, irrigated, and wild hay. Private timberlands are almost 6 percent of the County. Tract land covers over 2 percent of the County and includes tracts less than 20 acres and 20 to 60 acre tracts.

According to the Stillwater County Growth Policy (2007), the mix of public and private land use is projected to remain relatively constant. 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.

The City-County Planning Board is responsible for planning efforts within the Town of Columbus and their jurisdictional area adjacent to the Town. County Planning Boards focuses their planning on all jurisdictions in the County outside of the Town’s jurisdiction. The Planning Board’s functions include subdivision review and community planning. The City-County Planning Board acts as the Columbus Zoning Commission.

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 ordinances and subdivision regulations in accordance with guidelines set forth in the city growth policies. Building codes also play an important role to ensure commercial structures are constructed to safety standards.

Growth Policies

Stillwater County adopted a growth policy in 2007 to help address growth pressures. A Neighborhood Planning Addendum to the Stillwater County Growth Policy was completed in 2010. The Town of Columbus adopted a Growth Policy in 2012.

The Stillwater County Growth Policy (2007) recognizes that some lands have inherent public safety issues as well as being environmentally sensitive. In particular, places identified as at high risk for wildfire, flooding, high wind, and unstable slopes may not be appropriate for development without first doing mitigation. 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. Residents would like to see a more proactive effort to thwart wildfires before they start. They expressed a desire for a serious fuels reduction program and while many folks are aware of the FireWise fuels reduction program, not enough are using it.

The Town 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 Ordinances

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.) The Town of Columbus has adopted zoning ordinances. There is no zoning in the County.

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 Town of Columbus control development through the use of subdivision regulations. The regulations ensure that all subdivisions are designed so that potentially significant adverse impacts to public health and safety can be avoided or reasonably minimized. Among other

things, adverse impacts to public health and safety are defined as: disease control and prevention; flooding, fire or wildfire hazards, rock falls or landslides, unstable soils, steep slopes, and other natural hazards, 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 Town 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 snow and wind loads, roof construction, and seismic risk. 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 rural areas outside of Columbus. Montana has adopted the International Building Code.

Floodplain Regulations

Recurrent flooding of land resources causes loss of life, damage to property, disruption commerce and governmental services, and unsanitary conditions. These are all detrimental to the health, safety, welfare, and property of the occupants of flooded lands and the people of Stillwater County. 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. Digital Flood Insurance Rate Maps (FIRMs) have been completed for Stillwater County and these will be soon adopted and a floodplain regulations amended.

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 occur to serve an increasing population and 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 PDM Plan. Future development should be aware of the hazards present and implement mitigation measures.

According to the Stillwater County Overall Economic Development Plan (SCOEDP) (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.
- Highway 306 (Rapelje Road) where an Interstate 90 interchange
- Areas along the paved highways and the Montana Rail Link Rail Road at Park City, Reed Point, and Columbus.

Several infrastructure projects are on-line to be built in Stillwater County. Northwestern Energy is planning to build a 100kV transmission line from the Columbus Rapelje Substation to a new substation near Nye; and, the Altamont Gas Transmission Company is proposing to construct a 30 inch natural gas pipeline across northern Stillwater County.

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 was completed to help identify where mitigation measures could reduce loss of life or damage to property in the County and Town of Columbus.

This section includes a description of the risk assessment methodology and a hazard profile for eight hazards organized from high to low by county priority: wildfire, hazardous material incidents/transportation accidents, severe weather, flooding, communicable disease, drought, landslide, drought, and terrorism/violence/civil unrest. The section is concluded with a risk assessment summary and discussion on the location of future development projects. 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 geographic information system (GIS) software and data to develop vulnerability models for people, structures, critical facilities, and evaluating those vulnerabilities in relation to hazard profiles that model where hazards exist. 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 were mapped using coordinates provided by Stillwater County. Mapping of these facilities allowed for the comparison of their location to the hazard areas where such hazards are spatially recognized. 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.

Infrastructure, including bridges, water and wastewater facilities, and communication sites had digital mapping available and were therefore included in the analysis. Bridge data was obtained from the Montana Natural Resource Information System (NRIS) and the National Bridge Inventory while other data was obtained from the County. Replacement values of critical facilities were used in the risk assessment as this information was readily available from the County, Town of Columbus and Montana

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Cadastral Mapping Program. **Figures 3 and 3A** present the location of critical facilities in Stillwater County and Town of Columbus. Bridge replacement values were extrapolated using unit costs (developed by Lewis and Clark County) for span length and width. **Figure 4** presents the bridge locations in Stillwater County. The Critical Facility section in **Appendix C** presents a key to the bridge inventory. Stillwater County may wish to enhance the bridge data for the 2020 PDM Plan update by adding the major culverts in the county.

Building stock data was obtained from the Montana Department of Revenue's (MDOR) cadastral mapping program. This system spatially recognizes land parcels within the County with a distinction between residential and other properties. Appraised building values are available on the parcel level and were used to determine exposure. The "other" building type includes all properties not designated as residential and in this study and consists of commercial, agricultural and industrial properties. Data used for this analysis was from the State of Montana PDM Plan (2013). Building exposure in the risk assessment is presented for the incorporated town of Columbus and remainder of Stillwater County.

4.1.2 Vulnerable Population

Data from the 2010 census was used in the analysis to determine vulnerable populations at risk in the hazard areas, as available. Census data was downloaded from the U. S. Census Bureau's website. Downloaded data included total population (by census block) and number of individuals under the age of 18 for the County and Town of Columbus.

4.1.3 Hazard Identification

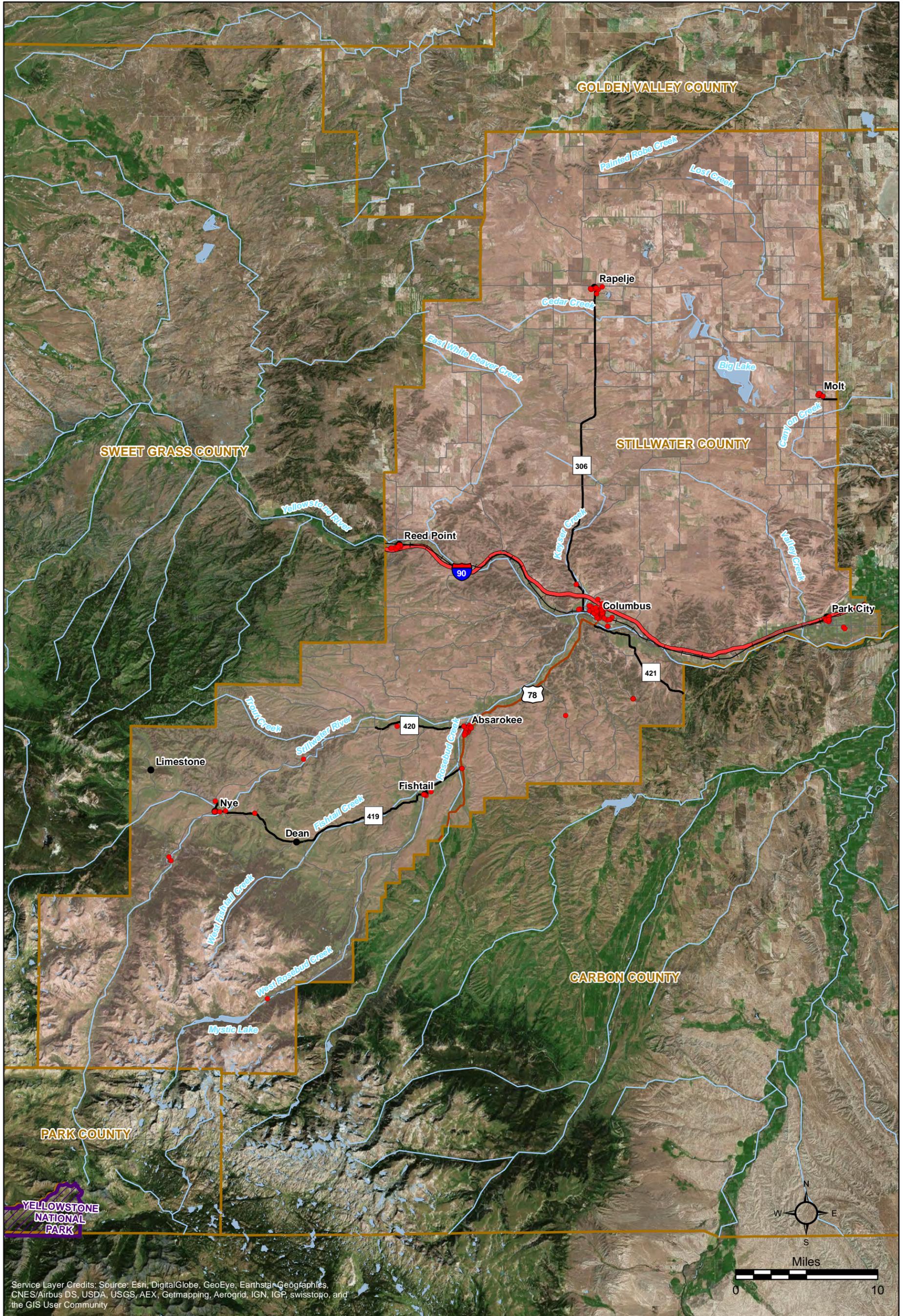
The 2010 Stillwater County PDM Plan identified 12 hazards affecting the County and Town of Columbus (wildfire, disease, severe weather, flooding, hazardous material release and explosions, transportation accident, drought, earthquake, dam failure, avalanche, landslides and avalanche, and volcanic ashfall). These hazards were reviewed for the 2015 PDM update by the Planning Team who considered what other emerging hazards might be of consequence since development of the original PDM Plan. The hazardous material and railroad accident is more significant due to transport of coal and oil from the Bakken oilfields through the County. Also, the terrorism hazard is of greater concern due to the large number of events held in the County that attract large numbers of people.

Hazards profiled in the 2015 update include those from the 2010 PDM Plan with the following changes: hazardous material releases and transportation accidents are discussed in one hazard profile, as are flooding and dam failure. The earthquake and volcanic ash hazards are considered low ranking and should be de-emphasized; therefore, limited profiles have been included in Appendix C. Hazards in the 2015 update were re-ranked using the Calculated Priority Ranking Index (CPRI) presented in Table 4.1.1 (see Plan 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 Plan Section 4.1.6). The level of detail for each hazard is generally limited by the amount of data available.





Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Legend

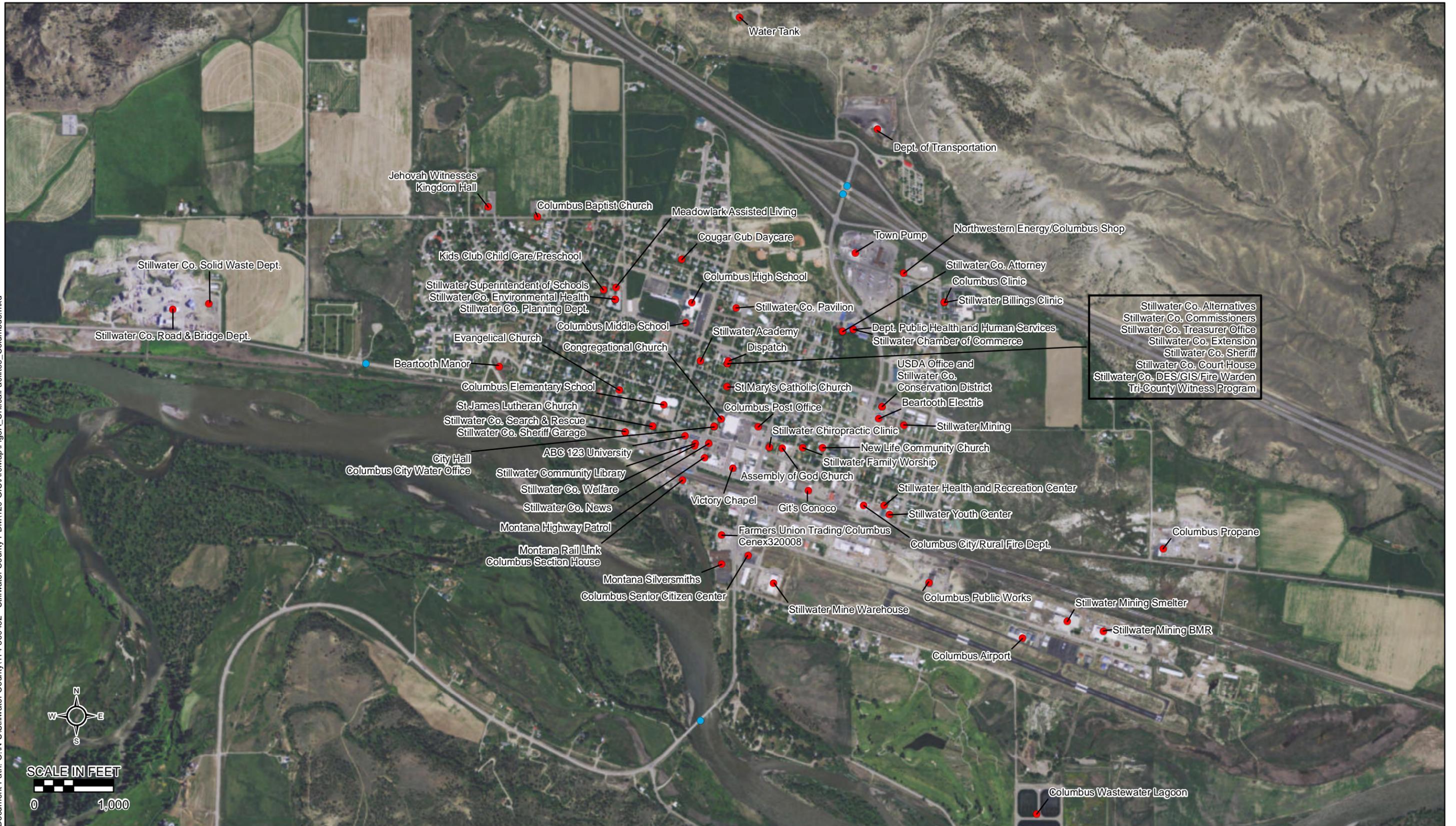
- Critical Facility
- County Seat
- Place Name
- Interstate
- Primary Route
- Secondary Route
- Other Route
- Railroad
- Lake/Reservoir
- River/Stream
- ▨ National Park
- ▭ County



August 2015

Figure 3
Critical Facilities
Stillwater County
Pre-Disaster Mitigation Plan

Document Path: O:\N-S\Stillwater County\114-560482 - Stillwater County_PDM\120-GIS\ArcMap\Fig3A_CriticalFacilities_Columbus.mxd



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

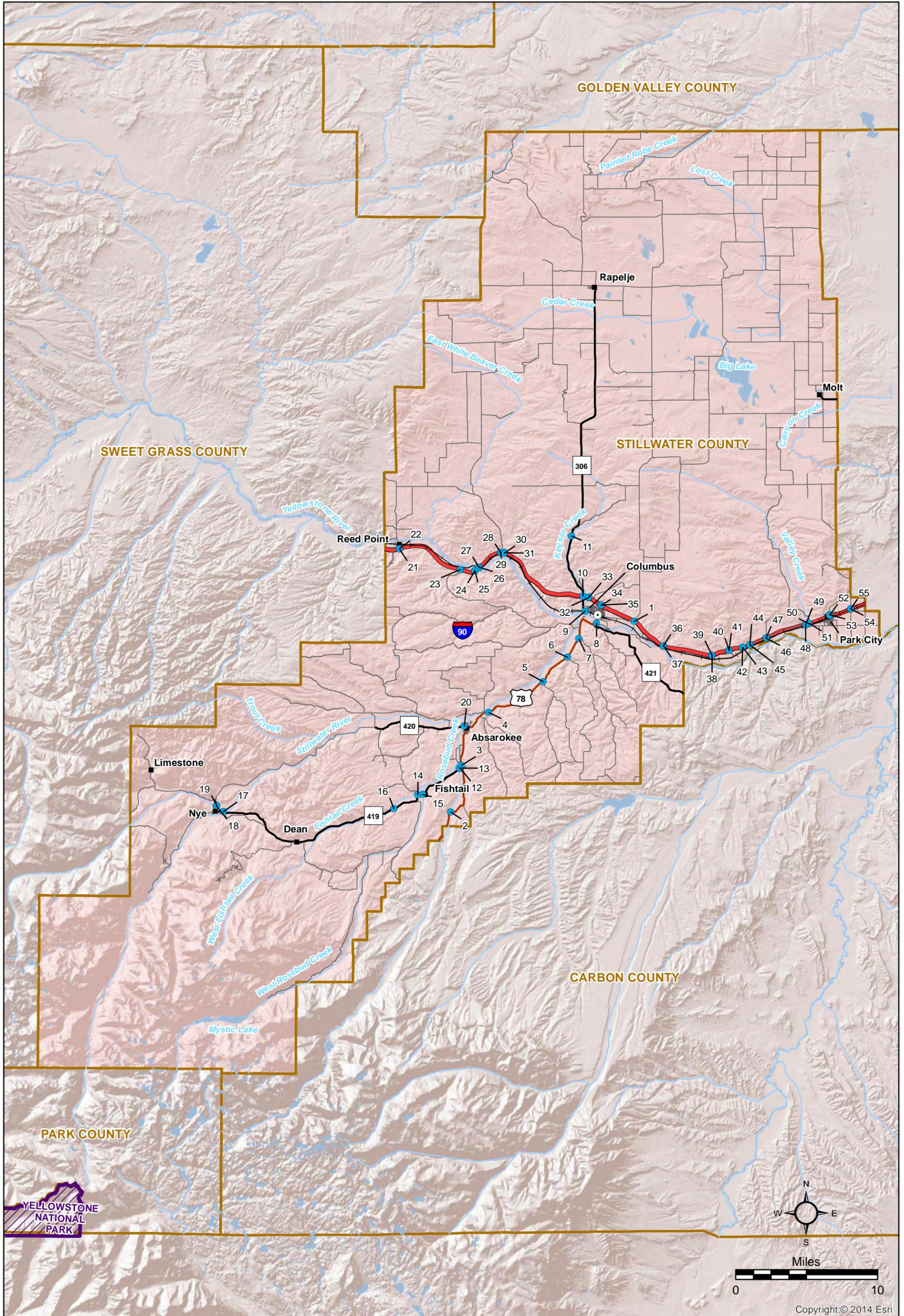


August 2015

Figure 3A

Columbus - Critical Facilities
Stillwater County

Pre-Disaster Mitigation Plan



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August 2015

Figure 4

Bridge Inventory
Stillwater County

Pre-Disaster Mitigation Plan



Legend

- | | | | | |
|-------------|---------------|-----------------|----------------|---------------|
| Bridge | Railroad | Secondary Route | Lake/Reservoir | National Park |
| County Seat | Interstate | Other Route | River/Stream | County |
| Place Name | Primary Route | | | |

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Each hazard profile contains a description of the hazard and the history of occurrence, the vulnerability and area of impact, the probability and magnitude of future events, and an evaluation of how future development is being managed to reduce risk. 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 general public. Storm Data is an official publication of the National Oceanic and Atmospheric Administration (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.

Vulnerability and Area of Impact

Vulnerabilities are described in terms of 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).



Section 4: Risk Assessment and Vulnerability Analysis

- 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:

$(\text{Property Damage} / \text{Number of Incidents}) / \$ \text{ of Building Stock Exposure} = \text{Magnitude}$ expressed as a percentage.

Future Development

The impact to future development was assessed based on potential opportunities to limit or regulate development in hazardous areas such as 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 the County from damage caused by natural and man-made hazards.

4.1.5 Hazard Ranking and Priorities

In ranking the hazards, the Planning Team completed a Calculated Priority Risk Index (CPRI) Work Sheet for each hazard. The CPRI examines four criteria for each hazard (probability, magnitude/severity, 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. Table 4.1-2** presents the results of the CPRI scoring for all hazards.

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Table 4.1-1. Calculated Priority Risk Index

CPRI Category	Degree of Risk			Assigned Weighting Factor
	Level ID	Description	Index Value	
Probability	Unlikely	<ul style="list-style-type: none"> ▪ Rare with no documented history of occurrences or events. ▪ Annual probability of less than 0.01. 	1	45%
	Possibly	<ul style="list-style-type: none"> ▪ Infrequent occurrences with at least one documented or anecdotal historic event. ▪ Annual probability that is between 0.1 and 0.01. 	2	
	Likely	<ul style="list-style-type: none"> ▪ Frequent occurrences with at least two or more documented historic events. ▪ Annual probability that is between 1 and 0.1. 	3	
	Highly Likely	<ul style="list-style-type: none"> ▪ Common events with a well documented history of occurrence. ▪ Annual probability that is greater than 1. 	4	
Magnitude/Severity	Negligible	<ul style="list-style-type: none"> ▪ Negligible property damages (less than 5% of critical and non-critical facilities and infrastructure). ▪ 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. 	1	30%
	Limited	<ul style="list-style-type: none"> ▪ Slight property damages (greater than 5% and less than 25% of critical and non-critical facilities and infrastructure). ▪ 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. 	2	
	Critical	<ul style="list-style-type: none"> ▪ Moderate property damages (greater than 25% and less than 50% of critical and non-critical facilities and infrastructure). ▪ 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. 	3	
	Catastrophic	<ul style="list-style-type: none"> ▪ Severe property damages (greater than 50% of critical and non-critical facilities and infrastructure). ▪ Injuries or illnesses result in permanent disability and multiple deaths. ▪ Shut down of critical facilities for more than 1 month. 	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	

Section 4: Risk Assessment and Vulnerability Analysis

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

Hazard	Probability	Magnitude and/or Severity	Warning Time	Duration	CPRI Score
Transportation Accidents	Highly likely	Critical	< 6 hours	< 1 week	4.00
Wildfire	Highly likely	Critical	< 6 hours	> 1 week	3.85
Hazardous Materials Incidents	Highly likely	Critical	< 6 hours	< 1 week	3.70
Severe Weather	Highly likely	Limited	6-12 hours	< 1 week	3.30
Landslide	Likely	Limited	< 6 hours	< 24 hours	3.10
Drought	Highly likely	Limited	> 24 hours	> 1 week	2.80
Communicable Disease	Highly likely	Limited	> 24 hours	> 1 week	2.70
Dam Failure	Unlikely	Catastrophic	< 6 hours	> 1 week	2.35
Terrorism, Violence, Civil Unrest	Possible	Limited	< 6 hours	< 6 hours	2.30
Earthquake	Possible	Limited	< 6 hours	< 6 hours	2.20
Avalanche	Possible	Negligible	< 6 hours	< 6 hours	1.90
Flooding	Possible	Limited	> 24 hours	< 1 week	1.50
Volcanic Ash	Unlikely	Negligible	> 24 hours	> 1 week	1.30

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 Planning Team felt that with the CPRI ranking did not accurately represent the County's priorities; therefore, the list of hazards was re-prioritized as shown below. The Earthquake and Volcanic Ash hazard profiles were deemed to be lower priority hazards and therefore, their hazard profiles are contained in **Appendix C**.

The remainder of this section contains the hazard profiles in this order.

- 1 – Wildfire (Plan Section 4.2)
- 2 – Hazardous Material Incidents / Transportation Accidents (Plan Section 4.3)
- 3 – Severe Weather (Plan Section 4.4)
- 4 – Flooding and Dam Failure (Plan Section 4.5)
- 5 – Communicable Disease (Plan Section 4.6)
- 6 – Drought (Plan Section 4.7)
- 7 – Landslide and Avalanche (Plan Section 4.8)
- 8 – Terrorism, Violence, Civil Unrest (Plan Section 4.9)

The Town of Columbus is not exposed to the landslide or avalanche hazards and their vulnerability to wildfire is much less than that of the County. Hazard ranking for the Town of Columbus are listed below:

- 1 – Hazardous Material Incidents / Transportation Accidents (Plan Section 4.3)
- 2 – Severe Weather (Plan Section 4.4)
- 3 – Flooding (Plan Section 4.5)
- 4 – Communicable Disease (Plan Section 4.6)
- 5 – Wildfire (Plan Section 4.2)
- 6 – Drought (Plan Section 4.7)
- 7 – Terrorism, Violence, Civil Unrest (Plan Section 4.9)

4.1.6 Assessing Vulnerability – Estimating Potential Losses

The methodology used in the vulnerability analysis presents a quantitative assessment of the building stock, population, and critical facility exposure to the individual hazards. Building stock data, available from the Montana Department of Revenue's (MDOR) cadastral mapping program was used in the analysis. This data spatially recognizes land parcels along with the appraised value of building stock. Using GIS, hazard risk areas were intersected with the building stock data to identify the number of structures and exposure due to each hazard. Using GIS, hazard risk areas were also intersected with critical facility data to determine the number and exposure of critical facilities to each hazard. Various infrastructure (e.g. water systems, wastewater systems) were analyzed as part of the critical facility vulnerability analysis. A separate analysis was completed for the County's bridges.

Population exposure was computed using data from the 2010 census and the percentage of the census blocks located in each hazard area. Population exposure is reported according to total population living in the hazard area and a subset of this data, individuals under the age of 18 years. Using GIS, total population for the census blocks was intersected with the hazard maps to determine the population at risk. It should be noted that there are some inherent inaccuracies using this approach. Using a percentage of census block population to compute the number of individuals living in the hazard area may include more persons than actually reside in the hazard area where census blocks are large.

For hazards that are uniform across the jurisdiction (i.e. severe summer weather and severe winter 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 that are not uniform across the jurisdiction and instead occur in specific areas (e.g. flooding, wildfire, hazardous material incidents, dam failure, etc.) the hazard area factored into the loss estimation calculations.

For hazards without documented property damage, magnitude could not be calculated and therefore, only the exposure of the building stock or population was computed. Annualized loss estimates cannot be calculated without property damage using this risk assessment approach.

4.1.7 Data Limitations

Risk assessment results are only a general representation of potential vulnerabilities and there are many inherent inaccuracies with the risk assessment methodology used. Output is only as good as the data sources used and Stillwater County may wish to consider alternate data for future PDM Plan updates.

The methodology used for the risk assessment has inherent limitations. Hazard layers were intersected with MDOR parcel data. The MDOR data does not locate structures within the parcel; therefore, any structures within a parcel “clipped” by the hazard layer were assumed to be vulnerable. Where parcels are large in size, it may be inaccurate to assume that all structures are actually within the hazard area. Therefore, exposure data for some hazards may over-report the number and value of structures at risk.

The remainder of this section presents hazard profiles organized by County priority followed by a risk assessment summary. Loss estimates, where applicable, are summarized at the end of this section.

4.2 Wildfire

CPRI SCORE = 3.7

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 have historically represented a threat of potential destruction 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 is the potential for a wildfire to adversely affect things that residents value - lives, homes, or ecological functions and attributes. 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, values potentially threatened by fire, and the availability (or lack) of resources to suppress a fire all contribute to wildfire risk. 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. 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 one or more of the following criteria in conjunction with "Very High" or "Extreme" fire danger: <ul style="list-style-type: none"> • 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 populated 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.
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 devise 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: NWS, 2015; National Interagency Fire Center; (gacc.nifc.gov/.../r2ftc/documents/Fire_Restriction_Chart.pdf)



Section 4: Risk Assessment and Vulnerability Analysis

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, 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 (Stillwater County Growth Policy, 2007). Stillwater County has large areas of government owned lands. The Custer Gallatin National Forest is managed by the US Forest Service. The Hailstone and Halfbreed National Wildlife Refuges are managed by the US Fish and Wildlife Service. Scattered across the county are large tracts of land managed by the US Bureau of Land Management and state government. This scattering of government and private ownership can present unique firefighting challenges and opportunities (2010 Stillwater Co. PDM Plan).

Wildfires can be caused by any flame source but are most often triggered by lightning, human carelessness, and arson. The railroad is also an ignition source for wildfire in Stillwater County. According to the Stillwater County Community Wildfire Protection Plan (2006), 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 down;
- Heavy, mature, fire-dependent fuels; and
- Rough breaks in the center and southern parts of the county and steep terrain and canyons.

Stillwater County has witnessed a number of wildfires that have destroyed property and affected wildlife habitat, scenic resources, and air quality. **Table 4.2-2** presents wildfire listings from the Montana DNRC, 10 acres in size and over with statistics on structures lost and suppression cost. **Table 4.2-3** presents wildfire data from the U.S. Forest Service and other federal land management agencies in Stillwater County.

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

Date	Name	Cause	Homes Lost	Outbuildings Lost	Acres	Suppression Cost
8/1/1996	Stillwater Complex	Lightning	-	-	46	\$21,591
8/19/1999	Eagle Mountain	Campfire	-	-	109	\$15,796
8/8/1999	Alex Creek	Lightning	-	-	1,231	\$20,632
5/5/2001	Svenson Ranch	Debris Burning	-	-	1,528	\$30,893
4/27/2002	Joe Hill/McNally	Lightning	-	-	300	\$9,447
9/2/2004	Pine Hill	Lightning	0	1	2,022	\$42,639
8/26/2005	Cottonwood Creek Fire	Lightning	0	0	3,485	\$288,536
8/14/2006	Bucket	Smoking	0	0	20	\$9,275
7/29/2006	Molt Assist	Lightning	0	0	310	\$5,824
7/6/2006	Park City Complex	Lightning	0	0	1,845	\$476,689
7/10/2006	Saunders	Debris Burning	6	0	3,150	\$863,401
8/19/2007	Springtime	Lightning	0	0	30	\$417
7/15/2007	Blown Tire	Equipment	0	0	120	\$64,984
9/3/2007	Hensley Creek	Equipment	0	0	220	\$55,311
8/14/2007	Pine Crest	Equipment	0	0	325	\$127,787
8/5/2008	Dovetail	Miscellaneous	0	0	150	\$112,580

Section 4: Risk Assessment and Vulnerability Analysis

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

Date	Name	Cause	Homes Lost	Outbuildings Lost	Acres	Suppression Cost
4/27/2008	Iron Bridge	Lightning	0	0	1,261	\$19,811
7/19/2009	Sweet Clover	Miscellaneous	0	0	190	\$8,034
9/3/2009	Eagle Mount	Powerlines	0	3	1,220	\$307,457
7/4/2010	Hearts & Diamonds	Fireworks	0	0	10	\$15,901
8/21/2010	Stump Gulch	Miscellaneous	0	0	9,870	\$732,594
7/25/2012	Skibstad	Equipment	0	10	3,348	
3/31/2015	Pine Crest	Slash Burning	2	3	3,000	\$500,000
TOTALS			8	17	33,790	\$3,729,599

Source: DNRC, 2015 and 2010 Stillwater County PDM Plan. Notes: “-” indicates no structure loss data prior to 2003

Table 4.2-3. Federal Land Wildfire Listings >10 Acres in Stillwater County

Date	Name	Cause	Acres	Damage Costs
8/16/1970	Sand Dunes	Smoking	110	-
11/9/1980	Big Park	Lightning	25	-
12/20/1980	Mary’s Pond	Lightning	15	-
11/30/1980	Benbow	Miscellaneous	460	-
1/12/1988	Stillwater	Miscellaneous	20	\$300
6/19/1988	Storm Creek	Miscellaneous	56,856	\$8,000,000
8/7/1990	Sand Dunes	Lightning	910	\$100,000
8/10/1999	Allen Creek	-	1,231	\$10,000*
5/5/2001	Svenson Ranch	-	1,528	\$55,000
8/19/2001	Little Park	Campfire	30	\$800
9/6/2002	Cow Creek	-	5,495	\$223,000*; 2 structures destroyed
8/10/2003	Hobble	-	38,365+	\$3,000,000
8/14/2003	Cathedral Peak	Lightning	1,973	\$5,800,000*; 1 structure destroyed
8/15/2003	Saderbalm	-	850	Not known
4/14/2006	Trout Creek	Human-caused	181	Not known
8/24/2006	Derby	Lightning	207,304+	\$22,500,000*; 26 homes destroyed
7/19/2007	Initial Creek	Lightning	16.5	Not known
8/1/2008	Tumble	Lightning	619	Not known
9/27/2011	Cathedral	Human-caused	60	Not known
TOTALS			69,503	\$39,679,100; 29 structured

Source: CWPP, 2005; Stillwater Co. 2010 PDM Plan; Custer Gallatin National Forest

Notes: “*” = suppression costs; “+” = includes acreage outside Stillwater County; “-” = not known

Presidential wildfire disasters were declared in 2000, 2003 (Hobble Fire), and 2006 (Derby Fire) for fires in Montana including Stillwater County. The Derby Fire is described below:

August 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. On August 29-30, 2006, the fire exploded by 135,000 acres, burning 26 homes and 20 outbuildings.



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Two significant wildfires have impacted Stillwater County since the 2010 PDM Plan was adopted, as described below.

August 2012 – Skidstad Fire – A generator kept in an enclosed shed was started and for an unknown reason, malfunctioned, starting the Skidstad Fire that ultimately burned 3.354 acres and 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. Skibstad Fire burns 3,354 acres and 10 buildings (Stillwater County News, August 2, 2012)

March 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. The rare winter wildland fire broke out in late March in a two-section 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. It was a wind-driven fire that eventually involved approximately 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 Bureau of Land Management, U.S. Fish and Wildlife and the U.S. Forest Service. DNRC spent more than \$500,000 fighting the fire. Low visibility from smoke associated with the Pine Crest fire was a factor in a fatal five-vehicle chain reaction accident on I-90. Pine Crest Fire ruled human-caused and accidental (Stillwater County News, June 25, 2015); 3,000-acre Pine Crest Fire claims 2 homes, 3 buildings (Stillwater County News, April 2, 2015).

Stillwater County completed a non-regulatory Community Wildfire Protection Plan (CWPP) in 2006. **Appendix E** contains a copy of this document. Mitigation projects identified in the CWPP are incorporated herein by reference.

Vulnerability and Area of Impact

Problems with wildfire also occur when combined with the human environment. 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.

According to the 2010 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 located in the wildland urban interface 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 Winge Ranch.



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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.

A significant loss of life could occur to residents, firefighters, and others who are in the wildfire area and do not evacuate. Infrastructure such as electric transmission lines, fuel tanks, and radio transmission towers are not often equipped to withstand the heat from a wildfire. Timber resources, animal habitats, and waterways can all be damaged leading to negative economic and environmental impacts.

A wildfire risk assessment, known as the West-Wide Wildfire Risk Assessment, was completed for 17 western states including Montana (Sanborn, 2012). The purpose of the project was to quantify the magnitude of the current wildfire problem and level of risk to communities and resources in the West with results comparable across geographic areas. According to this report, Stillwater County has 848,092 acres in the wildland category and 306,174 acres designated as non-wildland. Stillwater County's ranking in the four areas of wildfire risk is presented below.

- Fire Risk Index (FRI) - Measure of overall wildfire risk. Stillwater County is 27th among Montana counties in this category.
- Fire Effects Index (FEI) - Identifies areas with important values affected by wildland fire and/or that are costly to suppress. FEI is a weighted combination of the Values Impacted Rating and Suppression Difficulty Rating data. Stillwater County ranks 24th in this category among Montana counties.
- Fire Threat Index (FTI) - Wildfire threat is an index related to the likelihood of an acre to burn. The FTI integrates the probability of an acre igniting and the expected final fire size, based on the rate of spread in four weather percentile categories, into a single measure of wildfire threat. Stillwater County ranks 27th in this category among Montana counties.
- Wildland Development Areas - Describes where people are living in wildland areas. This dataset is derived from the LandScan population count data and represents the number of housing units per acre. Stillwater County ranks 13th in this category among Montana counties.

According to the Stillwater County CWPP (2006), the trend in climatic conditions in recent years has had major implications for wildland fire severity. Stillwater County has been experiencing a severe, long-lasting drought. The USDA declared the county a drought disaster for the past several years. 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 number of timbered areas of the county. The fire departments in the county are challenged to maintain an adequate volunteer staff. Serving as a volunteer on a department requires a time commitment not only to respond to calls, but also to maintain currency in training.

Probability and Magnitude

Property damage is difficult to obtain for wildfires since it is typically the agricultural and forest resources that sustain the damage. DNRC has collected data on structure loss from wildfires since 2003 (**Table 4.2-2**). This source, combined with structure loss reported in the 2010 Stillwater County PDM

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Plan, indicate that in the past 10 years, wildfire has destroyed 34 residential structures in the county. As such, the magnitude of wildfire can be correlated with the acres burned and cost to suppress the fire by local, state, and federal agencies. **Table 4.2-2** presents the wildfire events in Stillwater County with reported suppression costs. In the past 20 years, approximately \$44 million has been spent to suppress wildfires in Stillwater County.

Wildfire does not present a uniform risk across Stillwater County. **Figure 5** presents a wildfire risk map showing the WUI in Stillwater County. The WUI layer used for this analysis is from the CWPP (2006), as modified for the 2013 State of Montana PDM Plan. Private in-holdings and cabin sites within the Custer Gallatin National Forest were also added to the WUI map. To complete the vulnerability analysis for this project, GIS was used to intersect the WUI layer with both the critical facility and MDOR cadastral parcel datasets. Estimates of vulnerable population were calculated by determining the percent exposure in each census block for the hazard area. Exposure values are presented in **Table 4.2-4**. Building exposure reflects only the monetary structure value and does not account for improvements or personal effects that may be lost to wildfire. The Wildfire Section in **Appendix C** presents supporting documentation from the risk assessment including a list of critical facilities in the WUI.

Table 4.2-4. Stillwater Co. Vulnerability Analysis; Wildfire

Category	Stillwater County (balance)	Columbus, Town
Residential Property Exposure \$	\$320,954,896	\$65,383,045
# Residences At Risk	2,135	687
Commercial, Industrial & Agricultural Property Exposure \$	\$25,706,091	\$46,507,380
# Commercial, Industrial & Agricultural Properties At Risk	220	140
Critical Facilities Exposure Risk \$	\$42,129,632	\$89,519,263
# Critical Facilities At Risk	42	74
Bridge Exposure \$	\$7,672,858	\$0
# Bridges At Risk	42	0
Persons At Risk	4,710	1,893
Persons Under 18 At Risk	951	492

GIS analysis of the wildfire risk to Stillwater County indicates that approximately 320,851 acres (28 percent) are within the WUI. According to the vulnerability analysis, 2,822 residences, 360 commercial, industrial and agricultural buildings, and 116 critical facilities and locations where vulnerable populations reside are located in the WUI. Digital data on construction type for the facilities is not available but will be considered in future PDM updates.

The history of wildfires in the region has prompted Stillwater County to identify wildfire as a significant hazard. Smoke from fires both within and outside of the County can create poor air quality. Sensitive groups, such as the elderly and asthmatics, can be affected. Wildfires can also have a significant impact on the regional economy with the loss of timber, cultivated fields and pasture, natural resources, recreational opportunities, or tourism. Although the primary concern is to structures and the interface residents, most of the costs associated with fires come from firefighting efforts. As past events have also shown, infrastructure such as power transmission lines can also be threatened.

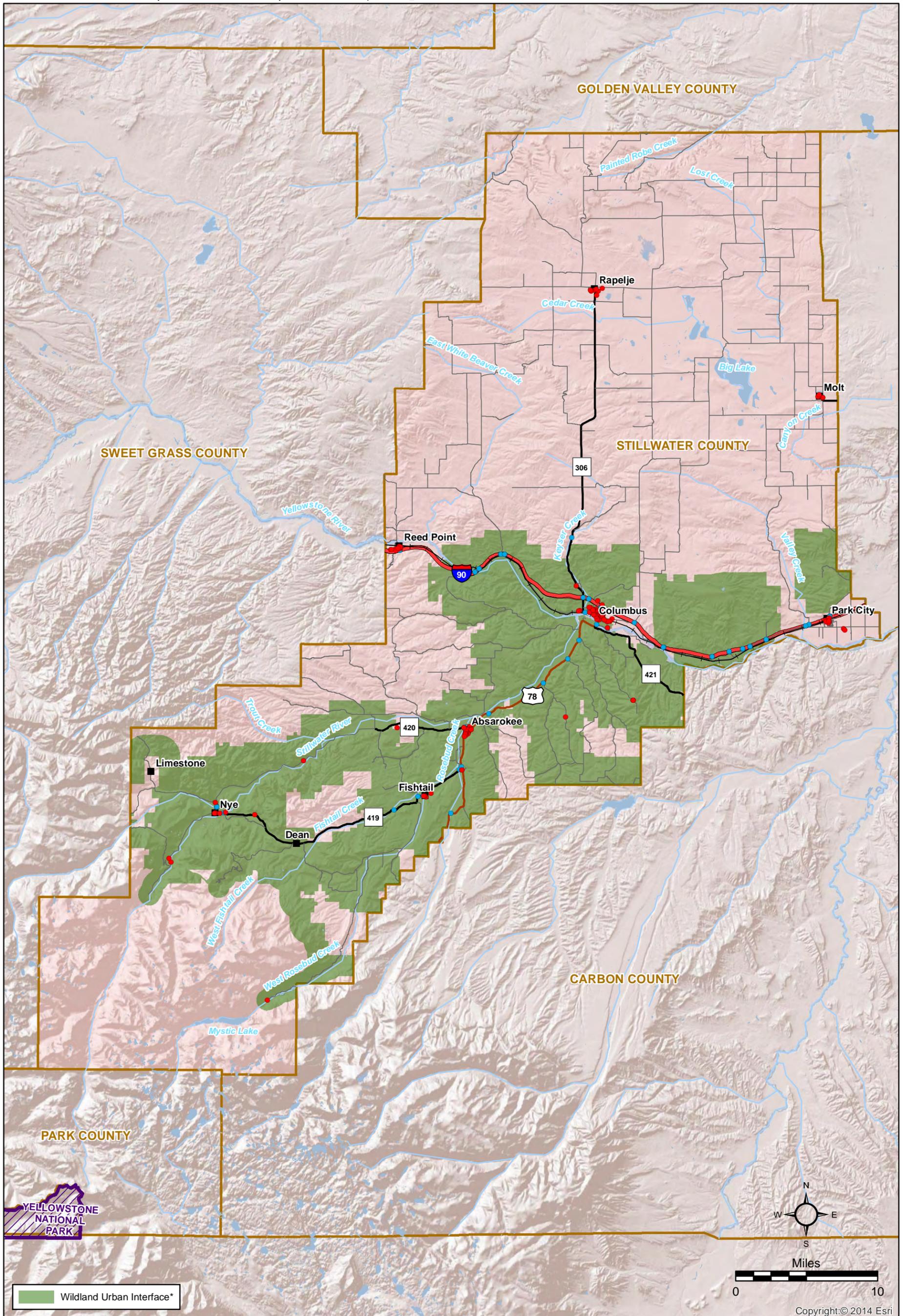
Wildfires generally occur more than once per year in Stillwater County and therefore, the probability of future events are rated as “highly likely”.

Future Development

Wildfire disasters can be mitigated through comprehensive land use planning that includes housing development design, fuels management, and public education. Regulations and ordinances addressing these issues in future development can play a significant role to minimize the danger posed by fire to residents, homes, and firefighters.

Both the Stillwater County Growth Policy (2007) and Town of Columbus Growth Policy (2012) state that subdivisions proposed in areas identified as a high fire hazard area by a fire district, or state of federal agency are considered to have adverse effects on public health and safety.

Subdivision Regulations for Stillwater County and the Town of Columbus have special standards for fire protection. All subdivisions must be planned, designed, constructed, and maintained so as to minimize the risk of fire and to permit the effective and efficient suppression of fires to protect persons, property and forested areas. All applications for proposed subdivisions in “high” to “extreme” fire hazard areas must contain a *Fire Prevention and Control Plan* which details how the subdivision will meet requirements for water supply and mitigating wildfire hazards.



*Wildland Urban Interface Risk Areas as Determined by the Local Community Wildfire Protection Plan and the Beartooth Ranger District, Custer Gallatin National Forest.



Legend

- | | | | | |
|---------------------|-----------------|-------------------|------------------|------------------|
| ● Critical Facility | — Railroad | — Secondary Route | 🌊 Lake/Reservoir | 🏞️ National Park |
| ● Bridge | — Interstate | — Other Route | 🌊 River/Stream | 🗺️ County |
| ■ Place Name | — Primary Route | | | |

4.3 Hazardous Material Incidents / Transportation Accidents

CPRI SCORES:
HAZ-MAT INCIDENTS = 3.6
TRANSPORTATION ACCIDENTS = 3.6

Description and History

The hazardous material and transportation accident hazards have been combined into one profile because they often occur together. Hazardous material incidents also occur at fixed facilities which in Stillwater County includes the Stillwater Mine and Montana Silversmiths, among others. Transportation accidents can occur on the highways, railroad, or in the air and often result in fatalities and injuries but rarely in property loss. Major roadways in Stillwater County include Interstate 90, Montana Highway 78, and Secondary Routes 306, 419, and 420. The railroad is operated by Montana Rail Link. Hazardous materials and wastes are continually present on these corridors. Because of the potential for future incidents involving hazardous materials on the railroad and highways in Stillwater County these two hazards are profiled together.

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 agricultural chemicals, are commonly stored and used in Stillwater County and are regularly transported via the regions roadways, railroads, and 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 transportation releases on railways. Hazardous material incidents that occur in Stillwater County are mostly minor. Records of hazardous material events from 1990 to 2015, available from the National Response Center database, are summarized in **Table 4.3-1**.

Table 4.3-1. Stillwater County Hazardous Material Incidents; 1990 - 2015

Incident Date	Type of Incident	Incident Cause	Location	Nearest City	Quantity Spilled/ Material Name	Comments
3/30/1993	Fixed	Equipment Failure	HC 54	Nye	5 gal. Fuel Oil	Fuel tank failure
5/30/1994	Unknown Sheen	Unknown	Midnight Canyon	Beehive	.25 gal. Motor Oil	Unknown sheen sighting
2/10/1997	Fixed	Equipment Failure	9 mi. N. of Molt	Molt	40 gal. Ethylene Glycol	Glycol injection line failed
3/31/1997	Mobile	Operator Error	Hwy 301	Molt	150 gal. Fuel Oil	Semi-truck overfilled
7/5/2000	Fixed	Operator Error	Hwy 64	Nye	3 gal. PCBs	Equipment fell and broke
7/21/2001	Pipeline	Explosion	Davidson/Grove	Absarokee	Natural Gas	Explosion; loss of garage
1/14/2002	Storage Tank	Other	2562 Nye Rd.	Nye	688 lbs Copper Sulfate	Tote fell off fork lift
8/22/2002	Railroad	Equipment Failure	MP 57, 2 nd Sub.	Reed Point	Non-Release	Empty coal train derailed
10/30/2004	Storage Tank	Operator Error	2562 Nye Rd.	Nye	130 gal. Waste Oil	Fork lift ran into tote
9/16/2005	Fixed	Other	3 mi. east	Columbus	Tires	Tire fire unknown cause
6/12/2006	Railroad	Equipment Failure	MRL	Craver	Non-Release	Freight train derailed

Source: National Response Center, 2015 (<http://www.nrc.uscg.mil/FOIAfiles>)

The U.S. Environmental Protection Agency (EPA) maintains the Toxic Release Inventory (TRI) of facilities that have released contaminants to the environment. TRI listings for Stillwater County are presented in **Table 4.3-2**.

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Table 4.3-2 - Toxic Release Inventory – Total Aggregate Releases; 2010-2013

Facility Name & Address	Air Emissions (Pounds)	Surface Water Emissions (Pounds)	Releases to Land (Pounds)	Underground Injection (Pounds)	Transfer Off-Site to Disposal (Pounds)	Total Releases (Pounds)
Montana Silversmiths						
2013	9,000	NR	NR	NR	NR	9,000
2012	9,000	NR	NR	NR	NR	9,000
2011	7,200	NR	NR	NR	NR	7,200
2010	12,600	NR	NR	NR	NR	1,2600
Stillwater Mining Company Nye Mine Site						
2013	237.5	NR	10,442.4	78,045.9	293,560.5	382,286.3
2012	341.1	NR	4,481.4	27,557	401,350.1	433,729.6
2011	101.9	NR	10,011.7	4,796.9	459,400.1	474,310.6
2010	132.9	NR	1,227.6	3,895.6	440,237.2	456,493.3
Stillwater Mining Company Precious Metals Smelter & Base Metals Refinery						
2013	634.9	NR	145.5	NR	NR	780.4
2012	563.5	NR	6.2	NR	NR	569.7
2011	513.6	NR	7.1	NR	NR	520.7
2010	472.2	NR	5.1	NR	NR	477.3

Source: EPA, 2015; (http://www.epa.gov/enviro/html/tris/tris_query.html)

Many facilities in Stillwater County sell or use hazardous materials including gas stations, agricultural chemical dealers, and fuel distributors. Stillwater County also is home to two pyrotechnic manufacturing plant and the Stillwater Mine where hazardous materials including explosives are used. Locations of facilities in Stillwater County with Tier II reporting requirements are listed in **Table 4.3-3**.

Table 4.3-3. Stillwater County Tier 2 Hazardous Material Reporters

Facility Name	Location	Facility Name	Location	Facility Name	Location
AT&T	Columbus	Flying J Oil & Gas		Park City CDO	Park City
AT&T	Rapelje	Git's Conoco	Columbus	PPL Montana, LLC	Fishtail
Bayswater E&P, LLC	Molt	Kinder Morgan		Reed Point Sinclair	Reed Point
Big Coulee	Ryegate	Kwik Stop, Inc.	Park City	Stillwater Mining Co.	Columbus
Century Link	Columbus	Montana Silversmiths	Columbus	Town Pump	Columbus
CHS, Inc.	Columbus	NorthWestern Energy	Fishtail	United Products	Rapelje
Columbus Propane	Columbus	Northern Energy	Nye	US West	Park City
Encana oil & Gas	Ryegate	Nye Trading Post	Fishtail	Verizon	Columbus
EnerSys		Olie's Corner Store	Absarokee		

Source: Stillwater County DES, 2015

Interstate-90 passes through Stillwater County east-west and several two-lane state highways traverse the north and south portions of the county. 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. A regional hazardous-material response trailer is positioned in Columbus.

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Statistics on highway accidents in Stillwater County over the past 10 years were provided by the MDT, and are presented in **Table 4.3-4**. Information is not available on whether these incidents involved a hazardous material response. In March 2015, low visibility from smoke associated with the Pine Crest fire was a factor in a fatal five-vehicle chain reaction accident on I-90.

Table 4.3-4. Stillwater County Highway Accidents; 2004 - 2014

Year	Number of Accidents	Fatalities	Injuries	Year	Number of Accidents	Fatalities	Injuries
2004	221	6	67	2009	230	1	52
2005	201	3	72	2010	175	0	49
2006	210	1	56	2011	201	2	40
2007	243	3	66	2012	260	4	60
2008	187	1	60	2014	248	0	56
				TOTAL	2,176	21	578

Source: MDT, 2015

Many trains pass through Stillwater County each day hauling coal, oil and other commodities. According to the National Transportation Safety Board (NTSB), 60 percent of all railroad accidents occur at unprotected or passive crossings. **Table 4.3-5** lists railroad accidents in Stillwater County and **Table 4.3-6** presents accidents at railroad crossings in the county.

Table 4.3-5. Stillwater County Railroad Accidents; 1975 - 2015

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	-
6/28/1981	Reed Point	0	0	0	0	-
5/20/1982	Spurling	0	0	0	0	-
1/12/1986	Reed Point	0	0	1	1	No haz-mat release
5/21/1989	Columbus	0	0	0	0	-
4/25/1990	Quebec	0	0	0	0	-
4/13/1991	Spurling	0	0	0	0	-
9/18/1995	Spurling	0	0	0	0	-
6/9/1996	Reed Point	0	0	3	0	No haz-mat release
8/1/2000	Rapids	0	0	12	0	No haz-mat release
10/23/2001	Craver	0	0	0	0	-
8/22/2002	Reed Point	0	0	0	0	-
12/31/2014	Columbus	0	0	0	0	-
TOTAL		0	0	16	1	

Source: Federal Railroad Administration, 2015; <http://safetydata.fra.dot.gov/OfficeofSafety/publicsite/Query/incabbr.aspx>

Table 4.3-6. Stillwater County Accidents at Railroad Crossings: 1975 - 2015

Date	Nearest RR Station	Road	Road Type	Fatalities	Injuries	Crossing Protection
1/1/1977	Columbus		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



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Table 4.3-6. Stillwater County Accidents at Railroad Crossings: 1975 – 2015

Date	Nearest RR Station	Road	Road Type	Fatalities	Injuries	Crossing Protection
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, 2015; <http://safetydata.fra.dot.gov/OfficeofSafety/publicsite/Query/gxrabbr.aspx>

The MDT recently launched a project to update signs along Montana Rail Link crossings by replacing existing crossbuck assemblies to include a yield or stop sign and/or adding emergency notification signs at every public crossing. Railroad crossings in Columbus, Park City and Reed Point are slated for the new signage. DOT updating, adding emergency signs at multiple MRL crossings (Stillwater County News, June 11, 2015).

Aviation accidents can occur for a multitude of reasons from mechanical failure to poor weather conditions to pilot error. The Federal Aviation Administration (FAA) has maintained a database of aircraft accidents since 1978. Database listings for Stillwater County are presented in **Table 4.3-7**.

Table 4.3-7. Stillwater County Aircraft Accidents

Date	Airport	Aircraft Make	Fatalities	Remarks
7/12/1985	Columbus	Piper J3C-65	2	Pilot pulled aircraft up abruptly and stalled at low altitude
3/27/1987	Columbus	Aeronca 7AC	0	Aircraft stalled after steep turn by student pilot
10/18/1991	Columbus	Cessna 172N	3	Failure to maintain adequate clearance from power lines
1/6/1996	Park City	Cessna 172K	0	Failure to maintain adequate clearance from power lines
9/9/1997	Columbus	Bellanca 7GCBC	0	Pilot passenger failed to maintain clearance from power line
7/26/1998	Columbus	Piper PA-18	0	Partial loss of power for undetermined reasons.
9/4/1999	Columbus	Bellanca 7GCBC	0	Failure to maintain directional control due to wet runway
6/4/2004	Columbus	Piper PA-18-150	0	Inadequate compensation for gusting winds during landing
7/20/2005	Park City	Piper PA-16	0	Failure of pilot to maintain directional control on takeoff roll
5/28/2007	Columbus	Hughes 369D	1	Fatigue failure of helicopter turbine blade

Source: FAA, 2015; http://www.faa.gov/data_research/accident_incident/

There have been no Presidential Disaster Declarations or State emergency declarations associated with the Hazardous Material Incident or Transportation Accident hazard in Stillwater County and the likelihood of a significant event resulting in a disaster declamation is considered low.

Vulnerability and Area of Impact

Privately-owned vehicles provide transportation for individuals in Stillwater County using the federal interstate and 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



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frequently. Low visibility from smoke associated with the wildfire can be a factor in vehicle accidents. Railroad related hazards such as derailments, toxic spill contamination, blocked evacuation routes and vehicle collisions are a threat to Stillwater County residents. 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.

Transportation of hazardous materials through Stillwater County on highways and by the railroads could result in an accident or derailment that would have the potential to impact Stillwater County residents. Large quantities of propane, anhydrous ammonia, explosives and petroleum products are stored in various locations. Although there is no history of significant incidents, the potential for a hazardous material accident in Stillwater County is present. There are several significant businesses in the county that use chemicals and explosives and rail traffic moving oil from the Bakken region has increased in the area.

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.

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 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. There are three TRI facilities in Stillwater County, as shown in **Table 4.3-3**.

The U.S. Department of Transportation issued an emergency restriction order on May 7, 2014 that requires railroad carriers to identify to the State Emergency Response Commission through which counties Bakken crude oil is being transported. The notification provides information regarding the estimated volumes and frequencies of train traffic per week and describes the petroleum crude oil expected to be transported and applicable emergency response information. MT DES forwards copies of the notifications to county emergency managers for their information and dissemination.

Coal mined in the Powder River Basin in southeastern Montana is transported by rail through Stillwater County. The length of the coal trains often block railroad crossings and have the potential to impact evacuation. Coal train traffic through the county could increase due to increased west coast coal exports in the future.

To model the spatial distribution of hazardous material incident risk a GIS data layer of transportation arteries was used, which included highways, major roadways, and railroads. TRI facilities were added to this layer and it was then buffered by 0.25 miles. Building exposure was calculated by intersecting the

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hazardous material buffer with the MDOR parcel and critical facility GIS layers. Population exposure was calculated by intersecting the hazardous material buffer with census block data. Limited property damage estimates are available from past hazardous material incidents so the estimates presented in **Table 4.3-8** represent exposure risk (vulnerability) in the hazard area. **Figures 6A and 6A** presents the hazardous material buffer in Stillwater County and Columbus, respectively, and show the vulnerability of critical facilities to hazardous material incidents.

Table 4.3-8. Stillwater Co. Vulnerability Analysis; Hazardous Material Incidents

Category	Stillwater County (balance)	Columbus, Town
Residential Property Exposure \$	\$100,147,052	\$43,665,248
# Residences At Risk	956	489
Commercial, Industrial & Agricultural Property Exposure \$	\$21,548,455	\$45,506,202
# Commercial, Industrial & Agricultural Properties At Risk	156	132
Critical Facilities Exposure Risk \$	\$40,372,632	\$48,599,659
# Critical Facilities At Risk	74	51
Bridge Exposure \$	\$9,759,534	\$0
# Bridges At Risk	47	0
Persons At Risk	4,144	1,491
Persons Under 18 At Risk	929	392

The GIS analysis indicates that there are over 26,848 acres in Stillwater County (2.3 percent) in the hazardous material buffer including 1,445 residences, 288 commercial, industrial and agricultural buildings, and 125 critical facilities. The Hazardous Material Incident Section in **Appendix C** lists the critical facilities within the hazardous material transportation buffer.

Probability and Magnitude

According to the U.S. Department of Transportation, Office of Hazardous Materials Safety, Stillwater County has had three hazardous material release with reported damages, as shown in **Table 4.3-9**.

Table 4.3-9. 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
1/11/2013	Columbus	Savannah Transport Inc.	20 gallons	Hazardous Waste	\$118,000	Highway

Source: U.S. Dept. Transportation, 2015; <https://hazmatonline.phmsa.dot.gov/IncidentReportsSearch/search.aspx>

The history of hazardous material events in Stillwater County indicates 11 incidents have occurred over the past 25 years. Therefore, the probability of future events is rated as “likely”. The PDM Planning Team rated this hazard as “highly likely”. The magnitude of any hazardous material event would depend on the amount and material spilled.

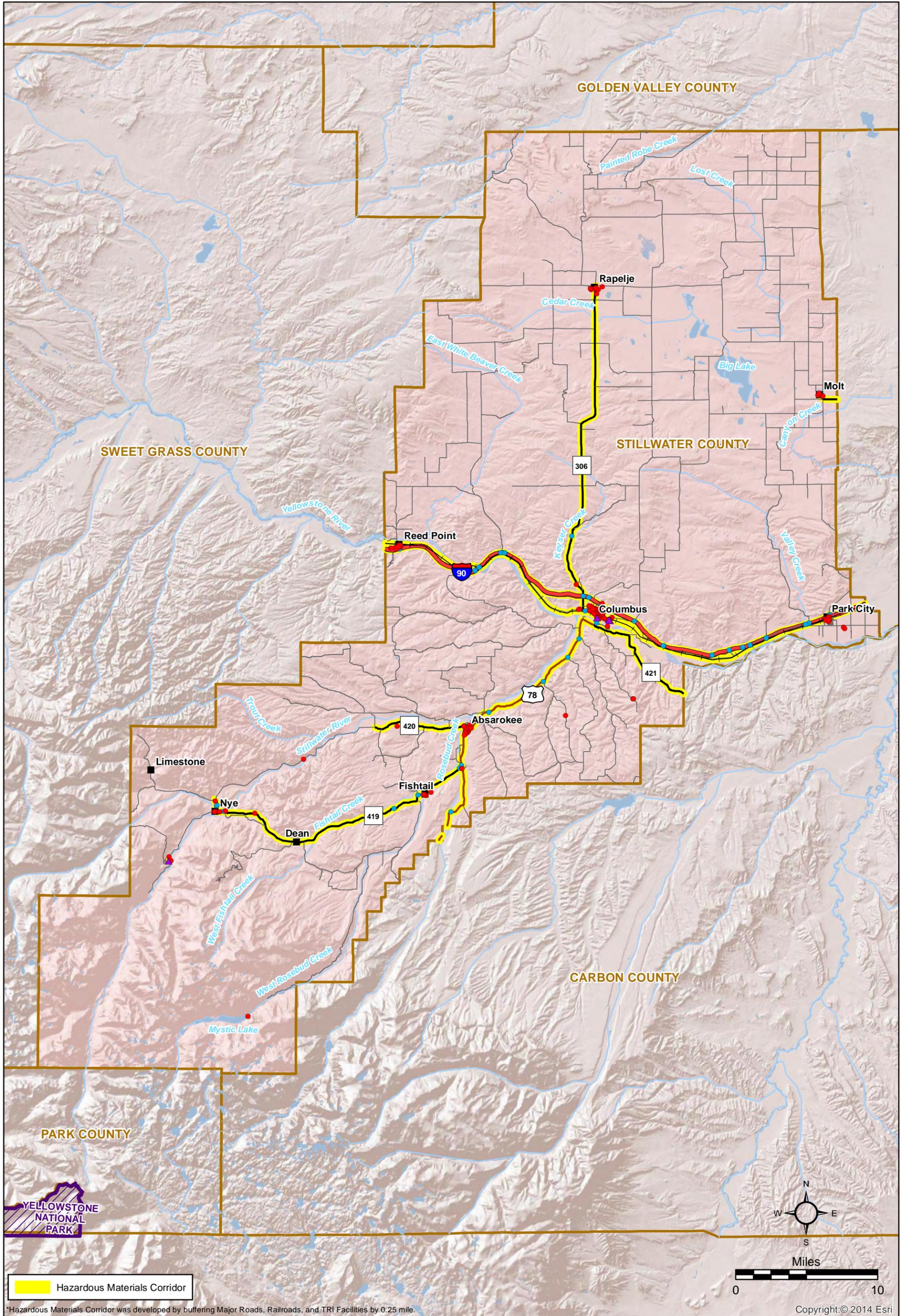
Stillwater County is vulnerable to all types of transportation emergencies. Stillwater County has numerous tour buses which pass through the county on the I-90 and the Stillwater Mine transports its employees by bus to the mine in the southern part of the county. A mass casualty incident involving a school bus and the railroad is also a possibility and a concern since remote locations have limited

Section 4: Risk Assessment and Vulnerability Analysis

resources making response time slow which could delay treatment of the injured. In the past 10 years, there have been 2,176 motor vehicle accidents that resulted in 21 fatalities and 578 injuries in Stillwater County. Therefore, the probability of future transportation accidents is rated as “highly likely”.

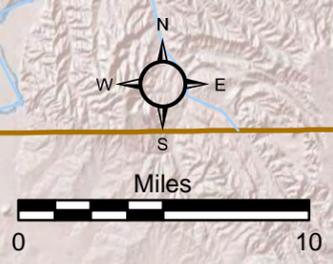
Future Development

Stillwater County has no land use regulations that restrict building around industrial facilities or along transportation routes or in the vicinity of facilities that store large quantities of hazardous materials or petroleum products.



Hazardous Materials Corridor

*Hazardous Materials Corridor was developed by buffering Major Roads, Railroads, and TRI Facilities by 0.25 mile.



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Legend



- ▲ Toxic Release Inventory Facility
- Critical Facility
- Bridge
- Place Name
- Railroad
- Interstate
- Primary Route
- Secondary Route
- Other Route
- Lake/Reservoir
- River/Stream
- ▨ National Park
- ▭ County

August 2015

Figure 6
Hazardous Material Transportation Buffer
Stillwater County
Pre-Disaster Mitigation Plan

Document Path: O:\N-S\Stillwater County\114-560482 - Stillwater County_PDM\120-GIS\ArcMap\Fig6A_CriticalFacilitiesHazMat_Columbus.mxd



 Toxic Release Inventory Facility
 Hazardous Materials Corridor

Hazardous Materials corridor was developed by buffering Major Roads, Railroads, and TRI Facilities by 0.25 mile.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Legend

-  Critical Facility
-  Bridge



4.4 Severe Weather

CPRI SCORE = 3.15

Description and History

Severe weather hazards have become more significant in recent years due to climate change. 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. Severe storms are not common; however, thunderstorms, hailstorms, high winds, heavy snow, freezing rain and sleet do occur. Available wind information indicates wind gusts in excess of 60 mph are not uncommon. The trend of variable weather conditions is expected to continue.

The winter weather hazard includes several weather conditions that occur from late fall through early spring in Stillwater County (November through April). Snow, blizzards, extended cold and high winds frequently occur together but also occur independent of one another during these months. Severe summer weather includes thunderstorms, wind, hail, lightning, tornadoes, and microbursts that typically occur between May and October of each year. Drought is profiled separated in *Section 4.7*.

Severe Winter Weather

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. Severe winter storms create conditions that disrupt essential regional systems such as public utilities, telecommunications, and transportation routes.

A combination of temperatures to 30 below zero and high winds can close roads, threaten disruption of utilities, 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 a shelter problem.

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**.

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

Winter Weather	Winter Weather Advisory	Winter Storm/Blizzard Warning
Snow	2-5 inches of snow in 12 hours	6 inches or more in 12 hours, or 8 inches in 24 hours
Blizzard	(see blowing snow)	Sustained winds or frequent gusts to 35 mph with visibility below a ¼ mile for three hours or more
Blowing Snow	Visibility at or less than a ½ mile.	Visibility at or less than a ½ mile in combination with snowfall at or greater than 6 inches and/or freezing precipitation
Ice/Sleet	(see freezing rain/drizzle)	Accumulations of ¼ inch or more of ice.
Freezing Rain/Drizzle	Light precipitation and ice forming on exposed surfaces.	None
Wind Chill	Wind chills of -20 to -39 degrees with a 10 mph wind in combination with precipitation	Wind chills -40 degrees or colder with a 10 mph wind in combination with precipitation.

Source: National Weather Service (NWS, 2015)

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. 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. State-wide winter storm disasters were declared in 1978, 1989 and 1996. **Table 4.4-2** presents the severe winter weather events since 1996.

Table 4.4-2. Stillwater County Severe Winter Weather Reports (~November-April)

Date	Event / Magnitude	Date	Event / Magnitude	Date	Event / Magnitude
1/10/2000	High Wind – 61 kts.	1/2/2007	High Wind – 66 kts	12/2/2010	Winter Storm
2/1/2000	High Wind – 58 kts.	1/4/2007	Heavy Snow	1/18/2011	Winter Storm
2/26/2000	Heavy Snow	1/7/2007	High Wind – 81 kts	1/20/2011	Blizzard
3/7/2000	Heavy Snow	1/9/2007	High Wind – 66 kts	2/4/2011	Winter Storm
4/2/2000	Heavy Snow	1/11/2007	Heavy Snow	2/12/2011	High Wind – 75 kts
9/22/2000	Heavy Snow	2/16/2007	High Wind – 70 kts	3/13/2011	High Wind – 62 kts
11/9/2000	Heavy Snow	3/30/2007	Heavy Snow	3/16/2011	Winter Storm
11/15/2000	Heavy Snow	11/4/2007	High Wind – 74 kts	3/21/2011	Heavy Snow
12/9/2000	Heavy Snow	11/12/2007	High Wind – 87 kts	3/22/2011	Heavy Snow
12/10/2000	Heavy Snow	11/19/2007	Heavy Snow	4/4/2011	Winter Storm
12/19/2000	High Wind – 63 kts.	12/2/2007	Winter Storm	4/7/2011	Winter Storm
12/30/2000	Heavy Snow	12/3/2007	High Wind – 70 kts	4/18/2011	Winter Storm
2/6/2001	Heavy Snow	12/24/2007	Winter Storm	5/19/2011	Winter Storm
4/21/2001	Heavy Snow	1/4/2008	High Wind – 68 kts.	5/29/2011	Winter Storm
6/14/2001	Heavy Snow	1/15/2008	High Wind – 53 kts	11/17/2011	High Wind – 66 kts
1/27/2002	Heavy Snow	1/19/2008	Winter Storm	11/23/2011	High Wind – 65 kts
2/24/2002	Heavy Snow	1/27/2008	High Wind – 70 kts	11/27/2011	High Wind – 66 kts
2/28/2002	Heavy Snow	1/31/2008	High Wind – 64 kts	12/21/2011	Winter Storm
3/14/2002	Heavy Snow	2/10/2008	Winter Storm	12/29/2011	High Wind – 58 kts
4/16/2002	Heavy Snow	2/12/2008	Heavy Snow	12/30/2011	Winter Storm
4/18/2002	Heavy Snow	3/4/2008	Winter Storm	1/14/2012	High Wind – 66 kts
5/7/2002	Heavy Snow	3/19/2008	Heavy Snow	1/17/2012	Winter Storm
5/8/2002	Heavy Snow	3/24/2008	High Wind – 64 kts	1/18/2012	Winter Storm
10/30/2002	Heavy Snow	3/31/2008	Heavy Snow	1/24/2012	High Wind – 74 kts



Section 4: Risk Assessment and Vulnerability Analysis

Table 4.4-2. Stillwater County Severe Winter Weather Reports (~November-April)

Date	Event / Magnitude	Date	Event / Magnitude	Date	Event / Magnitude
11/18/2002	High Wind – 63 kts.	4/15/2008	Heavy Snow	1/25/2012	High Wind – 74 kts
11/23/2002	Heavy Snow	5/9/2008	Heavy Snow	1/29/2012	High Wind – 55 kts
1/15/2003	Heavy Snow	5/11/2008	Heavy Snow	2/22/2012	High Wind – 64 kts
1/22/2003	Heavy Snow	5/21/2008	Heavy Snow	3/3/2012	High Wind – 56 kts
2/2/2003	Heavy Snow	6/12/2008	Heavy Snow	3/18/2012	Winter Storm
2/4/2003	Heavy Snow	10/9/2008	Winter Storm	3/20/2012	High Wind – 65kts
2/23/2003	Heavy Snow	11/12/2008	High Wind – 65 kts	4/5/2012	Winter Storm
3/6/2003	Heavy Snow	12/13/2008	Blizzard	11/8/2012	Winter Storm
3/9/2003	Heavy Snow	12/22/2008	Winter Storm	11/9/2012	Winter Storm
3/18/2003	Heavy Snow	12/27/2008	High Wind – 65 kts	12/2/2012	High Wind – 66 kts
3/27/2003	Heavy Snow	12/31/2008	High Wind – 68 kts	1/10/2013	Winter Storm
10/31/2003	Heavy Snow	1/1/2009	Winter Storm	1/27/2013	Winter Weather
11/4/2003	Heavy Snow	1/5/2009	High Wind – 68 kts	2/9/2013	Winter Storm
12/26/2003	Blizzard	1/6/2009	Winter Storm	4/21/2013	Winter Storm
2/29/2004	Heavy Snow	1/24/2009	Winter Storm	10/2/2013	Heavy Snow
4/9/2004	Heavy Snow	1/30/2009	High Wind – 71 kts	10/3/2013	Heavy Snow
10/23/2004	Heavy Snow	2/20/2009	Heavy Snow	10/13/2013	Winter Storm
11/28/2004	Heavy Snow	2/25/2009	Winter Storm	10/27/2013	Winter Storm
1/8/2005	Heavy Snow	2/26/2009	Winter Storm	11/8/2013	High Wind – 54kts
2/14/2005	Heavy Snow	3/3/2009	Winter Storm	12/1/2013	Winter Storm
3/12/2005	Heavy Snow	3/8/2009	Heavy Snow	12/2/2013	Winter Storm
3/24/2005	Heavy Snow	3/15/2009	Winter Storm	12/10/2013	Blizzard
3/26/2005	High Wind – 80 kts.	3/16/2009	Winter Storm	12/15/2013	High Wind – 52 kts
4/20/2005	Heavy Snow	3/22/2009	Winter Storm	1/3/2014	High Wind – 65 kts
4/27/2005	Heavy Snow	3/29/2009	Winter Storm	1/13/2014	High Wind – 60 kts
5/7/2005	Heavy Snow	4/2/2009	Winter Storm	1/15/2014	High Wind – 59 kts
5/11/2005	Heavy Snow	4/8/2009	Winter Storm	1/29/2014	Winter Storm
10/4/2005	Heavy Snow	4/26/2009	Winter Storm	2/12/2014	High Wind – 54 kts
10/5/2005	Heavy Snow	10/3/2009	Winter Storm	2/16/2014	High Wind – 56 kts
11/1/2005	High Wind – 76 kts.	10/4/2009	Winter Storm	2/17/2014	High Wind – 65 kts
11/14/2005	Heavy Snow	10/31/2009	High Wind – 67 kts	2/22/2014	Winter Storm
11/18/2005	High Wind – 66 kts.	11/11/2009	Winter Storm	2/23/2014	Winter Storm
12/23/2005	High Wind – 69 kts.	11/12/2009	Winter Storm	2/27/2014	Winter Storm
1/9/2006	High Wind – 72 kts.	12/13/2009	Winter Storm	3/10/2014	Winter Storm
1/10/2006	High Wind – 83 kts.	1/4/2010	Winter Storm	3/17/2014	Heavy Snow
1/17/2006	High Wind – 76 kts.	1/5/2010	Winter Storm	3/29/2014	Winter Storm
1/30/2006	High Wind – 70 kts	1/22/2010	Winter Storm	3/30/2014	Winter Storm
2/1/2006	High Wind – 81 kts	2/13/2010	Winter Storm	4/12/2014	Winter Storm
2/9/2006	Heavy Snow	3/29/2010	High Wind – 66 kts	11/25/2014	Winter Storm
2/27/2006	High Wind – 78 kts	3/30/2010	Heavy Snow	12/20/2014	Winter Storm
3/19/2006	Heavy Snow	4/1/2010	Heavy Snow	12/24/2014	High Wind – 69 kts
10/9/2006	Heavy Snow	4/28/2010	Heavy Snow	1/2/2015	Winter Storm
10/16/2006	Heavy Snow	5/5/2010	Winter Storm	1/3/2015	Winter Storm
10/21/2006	Heavy Snow	5/11/2010	Winter Storm	1/4/2015	Winter Storm
10/28/2006	High Wind – 73 kts	11/8/2010	Winter Storm	1/11/2015	Winter Storm
11/13/2006	High Wind – 68 kts	11/14/2010	Winter Storm	2/5/2015	High Wind – 78 kts
11/16/2006	High Wind – 77 kts	11/18/2010	High Wind – 58 kts	2/15/2015	Heavy Snow
12/13/2006	High Wind – 69 kts	11/23/2010	Winter Storm	2/20/2015	Winter Storm
12/23/2006	High Wind – 67 kts	11/25/2010	Blizzard	3/2/2015	Winter Storm

Source: NCDC, 2015. Notes: kts. = knots



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. Although not considered “severe”, lightning and heavy rain can also accompany thunderstorms. Thunderstorms can produce intense downburst and microburst wind. In addition, strong winds, defined below, can occur outside of thunderstorms when the overall weather conditions are favorable.

Tornadoes are the most concentrated and violent storms produced by the earth’s atmosphere. They are created by a vortex of rotating wind and strong vertical motion, which possess remarkable strength and can cause widespread damage. The most violent tornadoes are capable of tremendous destruction with wind speeds of 300 mph or more. Maximum wind speeds in tornadoes are confined to small areas and vary over short distances. Tornadoes are most common in the Great Plains, and are more infrequent and generally small west of the Rockies. Thunderstorms can produce deadly and damaging tornadoes.

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. 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, MT experienced extensive damage with some areas sustaining 80-90 percent tree mortality.

The NWS provides short-term forecasts and warnings of severe summer weather to the public by producing regularly-scheduled severe weather outlooks and updates on various forms of hazardous weather including tornado warnings, as shown in **Table 4.4-3**.

Table 4.4-3. Warning and Advisory Criteria for Summer Weather

Summer Weather Warning	Warning Description
Severe Thunderstorm	Any thunderstorm wind gust equal to or greater than 58 mph; any hail size 1-inch or larger.
High Wind	Sustained winds of 40 mph for an hour or any gust to 58 mph (non-convective winds).
Tornado	A violently, rotating column of air extending from the base of a thunderstorm to the ground.

Source: National Weather Service (NWS, 2015)

As of February 1, 2007, the NWS began using the Enhanced Fujita Scale for Tornado damage. The Enhanced F-scale is a set of wind estimates based on damage. It uses three-second gusts estimated at the point of damage based on a judgment of eight levels of damage to 28 indicators that vary with height and exposure.

Since the 2010 Stillwater County PDM Plan was completed, numerous incidents of severe summer weather have affected the county. **Table 4.4-4** presents severe summer storm events from the NCDC database indicating the magnitude of these events. There have been no Presidential Disaster Declarations or State Disasters issued for the severe summer weather in Stillwater County.

Section 4: Risk Assessment and Vulnerability Analysis

Table 4.4-4. Stillwater County Severe Summer Weather Reports (~May-October)

Date	Location	Event	Magnitude	Date	Location	Event	Magnitude
5/22/1958	Stillwater County	Hail	1 inch	6/27/2005	Reed Pt	Hail	1.25 inch
6/7/1958	Stillwater County	Hail	2 inch	7/15/2005	Park City	Tstm Wind	60 knots
6/18/1958	Stillwater County	Hail	1.75 inch	8/9/2005	Absarokee	Tstm Wind	65 knots
6/14/1962	Stillwater County	Hail	1 inch	8/11/2005	Molt	Hail	1.75 inch
7/15/1986	Stillwater County	Tstm Wind	56 knots	8/11/2005	Molt	Tornado	-
7/5/1987	Stillwater County	Hail	1.75 inch	7/12/2006	Park City	Tstm Wind	70 knots
8/20/1990	Stillwater County	Hail	1.25 inch	8/17/2006	Rapelje	Hail	1 inch
5/20/1991	Stillwater County	Hail	1.75 inch	5/13/2007	Rapelje	Hail	1.75 inch
7/8/1992	Stillwater County	Hail	1.5 inch	5/13/2007	Rapelje	Tstm Wind	66 knots
6/16/1994	Park City	Hail	1.75 inch	7/14/2007	Reed Pt	Hail	1.75 inch
6/29/1994	Stillwater County	Tstm Wind	52 knots	8/4/2007	Rapelje	Tstm Wind	56 knots
6/16/1995	Reed Point	Hail	1.75 inch	6/25/2008	Molt	Hail	1 inch
7/29/1995	Jordan	Tstm Wind	56 knots	7/1/2008	Park City	Hail	1.25 inch
5/22/1996	Columbus	Hail	1 inch	7/1/2008	Columbus	Tstm Wind	61 knots
6/26/1996	Molt	Hail	1.75 inch	6/30/2009	Columbus	Tstm Wind	61 knots
7/25/1996	Ryegate	Hail	1 inch	8/13/2009	Rapelje	Tstm Wind	53 knots
5/22/1997	Nye	Hail	-	6/16/2010	Columbus	Hail	1.75 inch
7/20/1997	Molt	Hail	1.75 inch	7/31/2010	Molt	Tstm Wind	52 knots
8/18/1997	Reed Pt	Hail	1 inch	6/2/2011	Rapids	Tstm Wind	52 knots
7/13/1998	Absarokee	Tstm Wind	-	6/6/2011	Molt	Funnel Cloud	-
8/13/1999	Molt	Hail	1 inch	6/6/2011	Columbus	Hail	2.75 inch
9/29/1999	Stillwater County	High Wind	51 inch	6/24/2011	Columbus	Hail	1 inch
10/31/1999	Stillwater County	High Wind	51 knots	7/3/2011	Wheat Basin	Hail	1 inch
6/9/2001	Rapelje	Hail	1 inch	7/6/2011	Reed Pt	Hail	1.75 inch
6/17/2001	Absarokee	Hail	1.25 inch	7/7/2011	Molt	Hail	1.75 inch
6/26/2001	Park City	Hail	1 inch	7/8/2011	Reed Pt	Tstm Wind	53 knots
7/13/2001	Rapelje	Hail	1 inch	8/29/2011	Rapids	Tstm Wind	55 knots
7/19/2001	Rapelje	Hail	1.75 inch	6/5/2012	Stillwater Co.	High Wind	65 knots
7/26/2001	Nye	Hail	1 inch	6/12/2013	Fishtail	Tstm Wind	55 knots
7/27/2001	Molt	Tstm Wind	70 knots	6/13/2013	Reed Pt	Hail	1.75 inch
5/14/2002	Stillwater County	High Wind	60 knots	6/19/2013	Columbus	Hail	1.75 inch
6/29/2002	Reed Pt	Tstm Wind	60 knots	6/22/2013	Reed Pt	Hail	1 inch
6/22/2003	Molt	Hail	1 inch	6/29/2013	Columbus	Tstm Wind	52 knots
7/26/2003	Columbus	Hail	1 inch	8/1/2013	Rapelje	Hail	1 inch
6/22/2004	Reed Pt	Hail	1.75 inch	9/7/2013	Rapelje	Tstm Wind	52 knots
6/15/2005	Rapelje	Tstm Wind	62 knots	5/18/2014	Reed Pt	Hail	1.75 inch
6/21/2005	Absarokee	Tstm Wind	70 knots	6/10/2014	Rapelje	Hail	1 inch
6/23/2005	Park City	Hail	1 inch	7/22/2014	Absarokee	Tstm Wind	61 knots

Source: NCDC, 2015. Notes: Tstm = Thunderstorm

Vulnerability and Area of Impact

Based on review of historic weather data, the entire project area has been classified with a uniform risk for severe 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. Winter storm events may affect the higher regions with more snowfall but the population is concentrated in the lower elevations so the hazard risk area is considered uniform for the entire county.



Section 4: Risk Assessment and Vulnerability Analysis

Probability and Magnitude

Tables 4.4-5 and 4.4-6 present severe weather events with reported damages from winter and summer events, respectively, from the SHELDUS and NCDC databases. The dataset used to populate SHELDUS typically 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. The NCDC data contains sporadic damage figures which were added to the dataset when they represented a unique damaging event.

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

Date	Injuries	Fatalities	Property Damage	Crop Damage	Remarks
2/25/1961	0	0	\$846	\$846	High wind
3/1/1961	0.04	0	\$1,657	\$0	High wind
12/21/1961	0.07	0	\$95	\$0	High wind and thunderstorms
2/22/1962	0	0	\$77	\$0	High wind, snow, blowing snow, cold
11/19/1962	0.07	0	\$6,907	\$0	High winds
2/1/1963	0.04	0	\$144	\$0	Freezing rain, high wind, snow
5/3/1964	0	0.04	\$14,206	\$0	Snow and high wind
12/15/1964	0	0	\$67,291	\$0	High wind, blowing snow, severe cold
1/15/1967	0	0	\$6,246	\$0	High wind
1/19/1967	0	0	\$1,978	\$0	High wind
1/1/1969	0	0	\$568	\$0	Cold and snow
1/26/1969	0	0	\$6	\$0	Lightning
1/9/1972	0	0	\$4,990	\$0	Strong winds
12/26/1972	0	0	\$109	\$0	Strong winds
3/23/1973	0	0	\$128	\$0	Snow storm and blizzard
4/18/1973	0	0	\$55,791	\$0	Blizzard
1/14/1974	0	0	\$4,824	\$0	Windstorm
1/29/1974	0	0	\$4,307	\$0	Wind
4/7/1975	0	0	\$46,043	\$0	Winter storm (severe blizzard)
10/15/1980	0	0	\$7,215	\$0	Snow
9/13/1982	0	0	\$6,845	\$6,845	Snow
3/2/1985	0	0	\$4	\$0	Heavy snow
11/23/1986	0	0	\$83	\$8	High winds
3/27/1987	0.14	0	\$75	\$0	Blizzard
12/9/1987	0	0	\$581	\$0	High wind
1/11/1988	0	0	\$718	\$0	Heavy snow
1/22/1988	0	0	\$77	\$0	High winds
2/15/1988	0	0	\$179	\$0	High winds
12/13/1988	0	0	\$143,585	\$1,436	Wind
12/29/1988	0	0	\$14	\$0	High wind
1/17/1989	0.33	0	\$15,982	\$0	High winds (g82)
1/17/1989	0	0	\$137	\$0	High winds
2/1/1989	0	0	\$168,227	\$168	Severe cold
4/27/1989	0	0	\$246	\$0	Winter storm
10/10/1989	0	0	\$74	\$0	High winds
10/28/1989	0	0	\$6,393	\$0	Heavy snow
11/7/1989	0	0	\$685	\$0	High wind
11/26/1989	0	0	\$46	\$0	Heavy snow
12/15/1989	0	0	\$1,370	\$0	Winter storm
1/8/1990	0	0	\$1,300	\$0	High wind



Section 4: Risk Assessment and Vulnerability Analysis

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

Date	Injuries	Fatalities	Property Damage	Crop Damage	Remarks
1/9/1990	0	0	\$1,300	\$0	High wind
3/12/1990	0	0	\$198	\$0	Winter storm
3/23/1990	0	0	\$13	\$0	Heavy snow
4/27/1990	0	0	\$2,843	\$0	Winter storm
11/22/1990	0	0	\$24,587	\$0	High winds
11/29/1990	0	0	\$6,065	\$0	High winds
3/3/1991	0	0	\$12	\$0	High winds
3/11/1991	0	0	\$397	\$0	Heavy snow
10/16/1991	0	0	\$178,163	\$0	Wind
10/31/1991	0	0	\$125	\$0	Winter storm
12/1/1991	0	0	\$12,471	\$0	Blizzard, snow, wind
1/23/1992	0	0	\$3	\$0	High winds
8/25/1992	0	0	\$0	\$1,487	Frost/freeze
11/30/1992	0	0	\$6,519	\$0	Wind
2/23/1994	0	0	\$14,076	\$0	Winter storm
3/23/1994	0	0	\$57	\$0	Heavy snow
6/16/1998	0	0	\$14,589.26	\$0	Heavy snow
12/28/1998	0	0	\$4,863	\$0	High wind
7/23/2000	0	0	\$27,620	\$0	Dry microburst
9/22/2000	0	0	\$1,933	\$0	Heavy snow
TOTAL	0.69	0.04	\$865,883	\$10,791	

Source: SHELUDS, 2015 (adjusted to 2014 dollars)

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.

Snow generally does not cause the 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.

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. Local government resources could be quickly overwhelmed. Mutual aid and state aid might be hard to receive due to the regional impact of this kind of event.

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 need be through pre-determined sheltering agreements in accordance with national standards.

Windstorms and microbursts affect areas with significant tree stands, as well as areas with exposed property, major infrastructure, and aboveground utility lines. High winds blowing soil and smoke from the Pine Crest fire created low visibility on I-90 and contributed to a fatal five-vehicle accident during March 2015. Also during March 2015, two homes in Columbus were damaged from trees that fell due

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to high winds. A 2010 Forest Service study indicated that the south end of Stillwater County experiences anomalous high winds. Winds funneled through the Benbow area in 2007 downing numerous trees creating a hazardous fuel situation which increased wildfire risk.

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, as peak activity coincides with peak agricultural seasons. **Table 4.4-6** presents severe summer weather events in Stillwater County with reported damages since 1960.

Table 4.4-6. Stillwater County Severe Summer Weather Events with Damages

Date	Injuries	Fatalities	Property Damage	Crop Damage	Remarks
5/10/1961	0	0	\$1,654	\$0	High winds and thunderstorms
5/30/1961	0	0	\$846	\$8,461	Thunder, heavy rain, hail storms
6/29/1961	0	0	\$846	\$8,461	Thunder, high wind, hail, heavy rain
6/14/1962	0	0	\$3,937	\$39,372	Hail
7/2/1964	0	0	\$0	\$1,596	Hail, thunderstorms
8/18/1964	0	0	\$0	\$1,596	Lightning
7/25/1968	0	0	\$0	\$427,092	Hail
6/27/1970	0	0	\$65,202	\$65,202	Strong winds, hail
10/1/1971	0	0	\$20,970	\$20,970	Heavy snow and rain
6/30/1973	0	0	\$80	\$812	Hail and strong winds
8/7/1975	0	0	\$460	\$4,604	Hail and wind
9/18/1983	0	0	\$6,283	\$628	Severe storm-snow
7/16/1986	0	0	\$271	\$27,122	Hail, thunderstorm wind
7/5/1987	0	0	\$0	\$10,467	Hail
6/16/1994	0	0	\$8,023	\$0	Hail
6/29/1994	0	0	\$8,023	\$0	Thunderstorm wind
7/13/1998	0	0	\$36,473	\$729,463	Thunderstorm wind
7/23/2000	0	0	\$27,620	\$0	Thunderstorm wind
TOTAL	0	0	\$180,688	\$1,345,845	

Source: SHELDUS, 2015 (adjusted to 2015 dollars); NCDC, 2015

Annual loss was computed for the severe summer and 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 4.4-7** presents the results of the calculations.

Table 4.4-7. Stillwater County Severe Weather Annual Loss

No. of Events	Period of Record (Yrs)	Frequency	Property Damage	Magnitude	Exposure	Annual Loss
Severe Summer Weather						
18	54	0.33	\$180,688	0.001381%	\$151,501,275	\$3,346
Severe Winter Weather						
60	54	1.11	\$875,883	0.001985%	\$151,501,275	\$16,035

Severe 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. The PDM Planning Team rated drought as “possible”.

Future Development

The State of Montana has adopted the 2009 International Building Codes (IBC) and these codes are recognized by Stillwater County and the Town of Columbus as the standards for construction. The IBC includes a provision that buildings must be constructed to withstand a wind load of 75 mph constant velocity and three second gusts of 90 mph. Buildings must be designed to withstand a snow load of 30 pounds per square foot minimum (Columbus, Reed Point, Park City and northern part of the county, 35 for the Absarokee area and 85 for southern Stillwater County (Stillwater County Growth Policy, 2007). Stillwater County does not require inspections to ensure the codes are followed.

The Stillwater County Road and Bridge Department has a Snow Removal Plan (2014-2015) which outlines the priority that roads will be cleared and the snow removal equipment available for the various routes. It stipulates that safety is of paramount importance and that operators shall use caution while plowing snow and will never jeopardize their own or public safety.

The town of Columbus has a Tree Maintenance Ordinance which establishes a tree board with the responsibility for public tree care. The ordinance provides clear guidance for planting, maintaining and removing trees from streets, parks and other public spaces which helps mitigate the impacts from severe storms.

4.5 Flooding and Dam Failure

CPRI SCORES:
FLOODING = 1.95
DAM FAILURE = 2.65

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 streams current accumulate at an obstruction to the stream. The water held back can cause flooding upstream, and if the obstruction suddenly breaks, flash flooding can then occur downstream as well.

It is estimated that flooding causes 90 percent of all property losses from natural disasters in the United States and kill 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.

Most of 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.

The Stillwater River drains over 900 square miles. Flows range from 600 cubic feet per second (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 smaller tributaries.

Rosebud Creek drains about 400 square miles in the county. 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. Stream flow volumes on the Yellowstone River differ greatly within the area. Peak flow usually occurs May to July. Average flows of 3,757 cfs have been recorded up river at Livingston and 6,913 cfs down river at Billings.

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

The NWS 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

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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

Summer Weather Warning	Warning Description
Flash Flood Warning	Flooding is imminent, water levels rise rapidly with inundation occurring in less than 6 hours.
Flood Warning	Flooding is expected to occur more than 6 hours after the causative event.

Source: National Weather Service, 2015

According to the Stillwater County Growth Policy (2007), heavy spring rains in conjunction with snowmelt runoff have caused major floods in Stillwater County. The headwaters of most streams studied lie at high altitudes and these areas can accumulate heavy winter snowpacks. 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, 2014a). Extensive flash flooding from rapid snow melt in 2014 caused damage county-wide. Some years, ice jamming is problematic.

Major floods have been recorded in 1911, 1921, 1923, 1937, 1943, 1944, 1948, 1962, 1967, 1970, 1974, 1975, 1996 and 1997 on the Yellowstone River, the Stillwater River, Rosebud Creek and tributaries. The trend of periodic flooding is expected to continue. Presidential Disasters due to flooding were declared in Stillwater County in 1978 and 2011. Statewide flood emergencies were declared in 1978, 1981, 1984, 1986, 1997, 1998, 2003 and 2013 (DMA, 2015).

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. Others may be located in areas that result in little if any damages during a failure.

The U.S. Army Corps of Engineers, National Inventory of Dams (NID) website keeps a record of dams across the country. Montana DES also keeps an extensive library of Emergency Action Plans (EAPs) for the state’s high hazard dams. 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 below.

Table 4.5-2. 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: National Inventory of Dams, 2015

Stillwater County has one high hazard dam, the Mystic Lake dam, as described below. There are no dams in adjoining counties with the potential to impact human live in Stillwater County.

Built in 1925, the Mystic Lake dam and hydroelectric facility is on West Rosebud Creek in the Beartooth Mountains, on West Rosebud Creek, in Stillwater County. It is located on U.S. Forest Service (Forest Service) lands within the Custer National Forest and operated by NorthWestern Energy.



The Mystic Lake Project has two reservoirs on West Rosebud Creek: (1) Mystic Lake, which is the project’s storage reservoir; and (2) West Rosebud Lake, which is located downstream of Mystic Lake and is used to moderate peaking flows from the powerhouse. Water flowing into Mystic Lake is impounded by Mystic Lake dam, which is a 45-foot-high, 368-foot-long concrete arch-type structure. Mystic

Lake has a full pool elevation of 7,673.5 feet above mean sea level and a total volume of about 47,000 acre feet (FERC, 2007).

There is no record of failure of a high or significant hazard dam in Stillwater County.

Vulnerability and Area of Impact

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 (FEMA, 2014a).

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

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widespread damage to residences, farm buildings, bridges, and summer homes throughout Stillwater County (FEMA, 2014a).

Development in floodplains results in a concurrent risk of property damage due to floods and impacts on city services for risk protection during flood season. **Figures 7 and 7A** present the flood-prone areas within Stillwater County and Town of Columbus, respectively. These maps were developed from digital flood insurance rate maps (DFIRMs).

Dams with the highest risk to life and property were they to breach are rated as high hazard dams. Those areas directly downstream from high hazard dams would be the areas most at risk for loss of life and structural damage. **Figures 8 and 8A** present the inundation area associated with the Mystic Lake dam. Stillwater County DES has the Emergency Action Plan for the Mystic Lake dam and conducts regular exercises with the dam owner and other emergency response personnel.

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, 2014a).

Floodplain and Floodway Management

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 Town of Columbus participate in the NFIP. **Table 4.5-3** presents statistics on flood insurance policies and losses.

Table 4.5-3. National Flood Insurance Program Statistics (through 4/30/2015)

Jurisdictions	Policies in Force	Insurance in Force	Number of Losses	Total Payments
Stillwater County	88	\$19,566,300	17	\$53,946.30
Town of Columbus	2	\$392,000	1	\$0

Source: FEMA, 2015. <http://bsa.nfipstat.fema.gov/reports/1011.htm#MTT>;
<http://bsa.nfipstat.fema.gov/reports/1040.htm#30>

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 completely digital FIRMs (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.

FEMA's Risk, Mapping, Assessment, and Planning (Risk MAP) program provided Stillwater County with flood risk information and tools that increase resilience to flooding to better protect its citizens. The 2014 Flood Risk Report provides information identifying a number of areas vulnerable to flooding in Stillwater County. These problem areas are included in this Plan as mitigation projects.

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Stillwater County and the Town of Columbus have passed Floodplain and Floodway Management Ordinances to comply with the Montana Floodplain and Floodway Management Act and to ensure compliance with requirements for continued participation in the National Flood Insurance Program. The floodplain ordinances identify land use regulations to be applied to all identified 100-year floodplains within local jurisdictions. Most construction within the 100 year floodplain or floodway requires a permit obtained through the office of the Floodplain Program Administrator.

According to DNRC, there are no repetitive loss properties in Stillwater County or the Town of Columbus. 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 ten-year period, since 1978. There are no severe repetitive loss properties in Stillwater County or the Town of 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.

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 ten classes. Your discount on flood insurance premiums is based on your class. Neither Stillwater County nor Columbus participate in the CRS.

Probability and Magnitude

Flood listings with associated property damage from the SHELDUS database and Montana DES database of State and Federal disaster declarations are presented in **Table 4.5-4**. There is no history of a dam failure in Stillwater County.

Table 4.5-4. Stillwater County Flood Events with Damages

Date	Injuries	Fatalities	Property Damage	Crop Damage	Remarks
3/31/1969	0	0	\$5,684	\$0	Flooding
2/20/1971	0	0	\$11,292	\$0	Flooding
6/9/1972	0	0	\$10,941	\$0	Heavy rain, flooding
3/10/1989	0	0	\$7,991	\$0	Flooding
1/25/1993	0	0	\$117	\$0	Ice jam
3/10/1994	0	0	\$20,058	\$20,058	Ice jam flooding
5/30/2011	0	0	\$2,114,395	\$0	Flood
TOTAL	0	0	\$2,170,477	\$20,058	

Source: SHELDUS, 2015 (adjusted to 2015 dollars); NCDC, 2015

The DFIRM-generated flood hazard layer is shown on **Figures 7, 7A, and 7B** for the County, Columbus, and Fishtail. The dam inundation hazard layer is shown in **Figures 8 and 8A** for the County, Absarokee, and Fishtail. Columbus is not at risk of inundation from the dam failure hazard. Both the flood and dam inundation hazard areas were intersected with the critical facility and MDOR parcel datasets using GIS

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(Tables 4.5-5 and 4.5-6, respectively). Vulnerable population was calculated based on the percentage of flood risk area in each census block. The Flooding Section in **Appendix C** presents supporting documentation from the risk assessment.

Table 4.5-5. Stillwater County Vulnerability Analysis; Flooding

Category	Stillwater County (balance)	Columbus, Town
Residential Property Exposure \$	\$150,168,840	\$2,914,724
# Residences At Risk	972	38
Commercial, Industrial & Agricultural Property Exposure \$	\$6,229,662	\$8,872,961
# Commercial, Industrial & Agricultural Properties At Risk	74	27
Critical Facilities Exposure Risk \$	\$132,996	\$0
# Critical Facilities At Risk	3	1
Bridge Exposure \$	\$4,142,112	\$0
# Bridges At Risk	18	0
Persons At Risk	3,857	197
Persons Under 18 At Risk	802	48

The GIS analysis indicates that about 35,609 acres in Stillwater County (3 percent) are located in parcels within the flood hazard area including: 1,010 residences, 101 commercial, industrial and agricultural buildings, and 4 critical facilities or locations where vulnerable populations reside. It should be noted, however, that the analysis methods used may indicate more structures and value at risk than in actuality because the data does not distinguish where on the parcel the structures are located and structures on any parcel “clipped” by the hazard area are assumed to be at risk.

Based on the frequency of past events, the probability of flooding in Stillwater County is rated as “possible”; an event that occurs less than once per decade but more than once every 100 years.

Table 4.5-6. Stillwater County Vulnerability Analysis; Dam Failure

Category	Stillwater County (balance)	Columbus, Town
Residential Property Exposure \$	\$69,450,846	\$719,297
# Residences At Risk	564	7
Commercial, Industrial & Agricultural Property Exposure \$	\$12,704,117	\$3,708,643
# Commercial, Industrial & Agricultural Properties At Risk	88	3
Critical Facilities Exposure Risk \$	\$23,332,777	\$0
# Critical Facilities At Risk	25	0
Bridge Exposure \$	\$1,302,096	\$0
# Bridges At Risk	5	0
Persons At Risk	1,878	44
Persons Under 18 At Risk	400	7

The GIS analysis indicates that 6,355 acres in Stillwater County are located in the dam inundation hazard area (0.55 percent) including 571 residences, 91 commercial, industrial and agricultural buildings, and 25 critical facilities or locations where vulnerable populations reside. This analysis has similar limitations as those described for flooding.

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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 a high hazard dam breach in Stillwater County was ranked as “unlikely” by the Planning Team.

A high magnitude dam failure can represent more than one threat of damage. The most obvious threat is the floodwater generated by sudden breaching of the dam which can result in direct damage due to submergence, hydraulic damage, and loss of life or property damage. A less obvious threat is sedimentation which can threaten the integrity of a downstream structure.

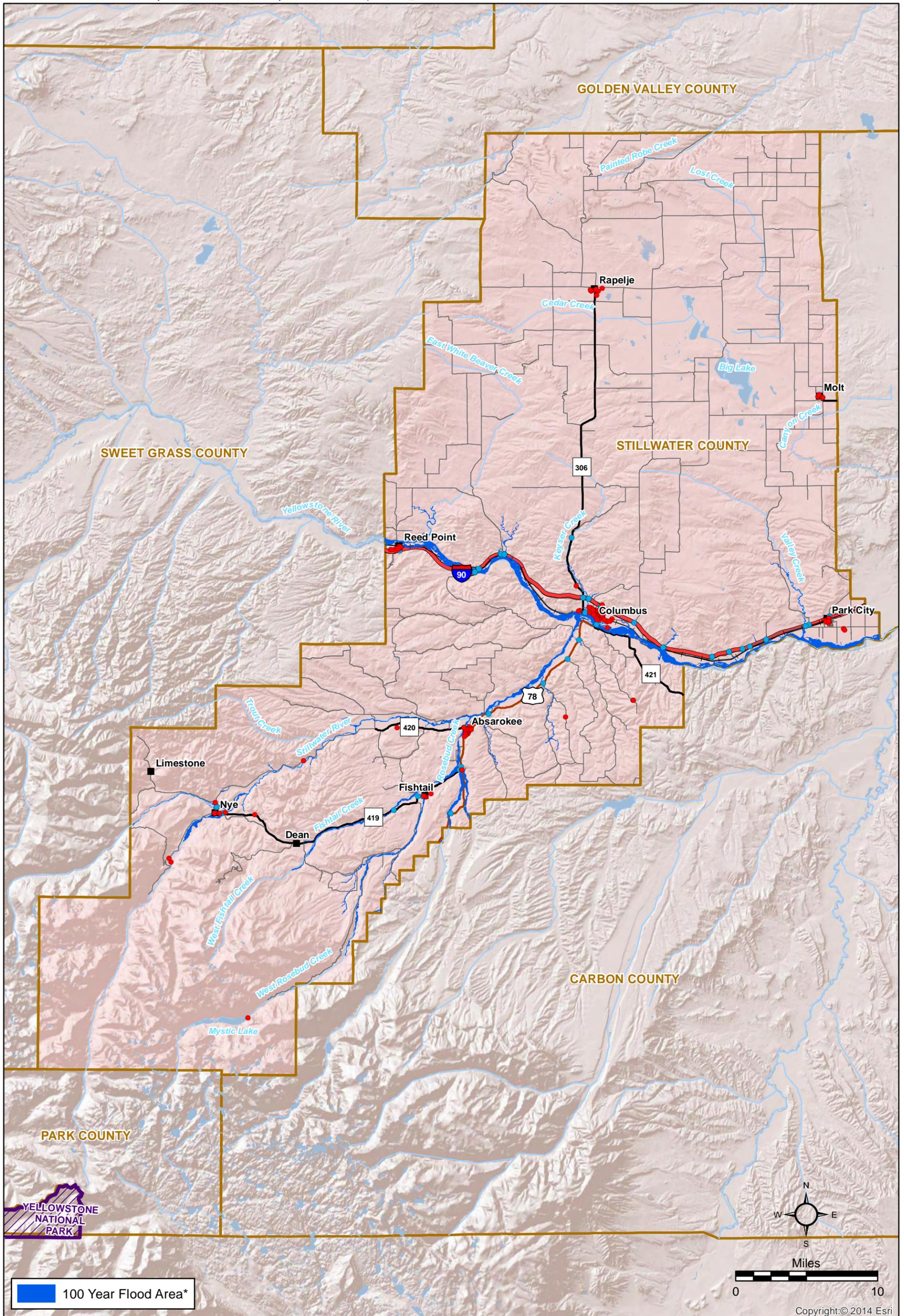
Future Development

The river, stream, pond, and lake frontage property in Stillwater County is among the most desirable for new development. The Stillwater County and Town of Columbus subdivision regulations stipulate that land located in the 100-year floodplain or deemed subject to flooding shall not be subdivided for building or residential purposes. Building in the 100-year floodplain requires state, federal, and local permits and buildings must be elevated two feet above the base flood elevation with no basements. There are no restrictions for building in the 500-year floodplain. Design and improvement standards in the regulations state that each subdivided parcel with individual water and sewer system shall contain at least one acre of buildable land outside the floodplain portion of a delineated 100-year floodway. The subdivision regulations provide standards for flood hazard evaluation in subdivision review.

The Stillwater County and Town of Columbus updated with Floodplain Ordinance in conjunction with new FEMA Flood Insurance Rate Maps. These regulations basically preclude new structural development within areas classified as designated floodways under state law.

Town of Columbus Zoning Regulations indicate that a floodplain district has been established and land use within the designated floodplain district is subject to provisions of the town's floodplain management ordinance and all applicable state and federal laws and regulations.

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



*Flood Hazard Area as Determined by County DFIRM (Digital Flood Insurance Rate Maps) and Preliminary Flood Risk Datasbase (Effective Oct. 15, 2015).



Legend

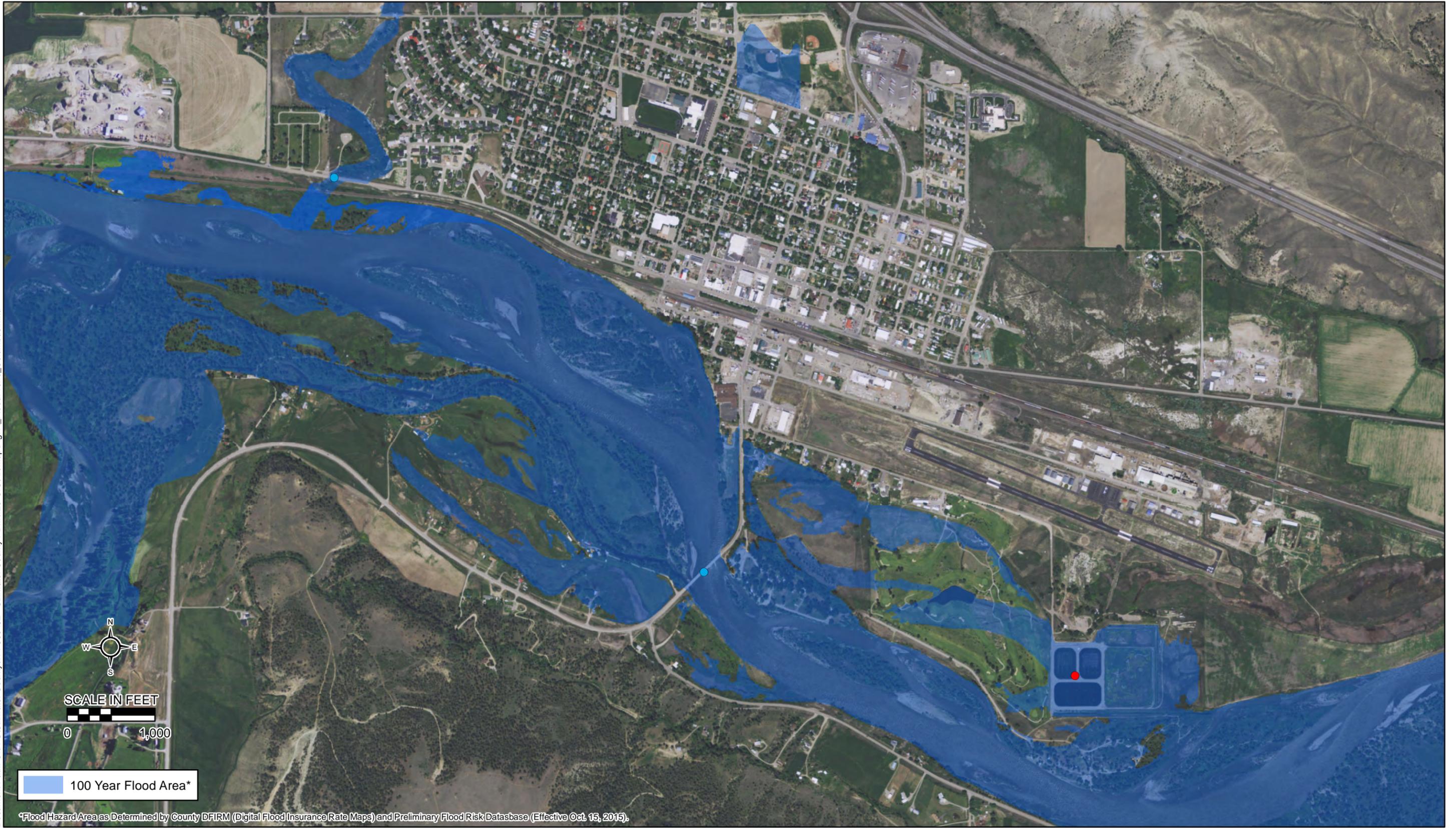
- Critical Facility
- Bridge
- Place Name
- Railroad
- Interstate
- Primary Route
- Secondary Route
- Other Route
- Lake/Reservoir
- River/Stream
- ▨ National Park
- ▭ County

Figure 7

Flood Prone Areas
Stillwater County

Pre-Disaster Mitigation Plan

Document Path: O:\N-S\Stillwater County\114-560482 - Stillwater County_PDM\120-GIS\ArcMap\Fig7A_FloodProne_Columbus.mxd



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Legend

- Critical Facility
- Bridge



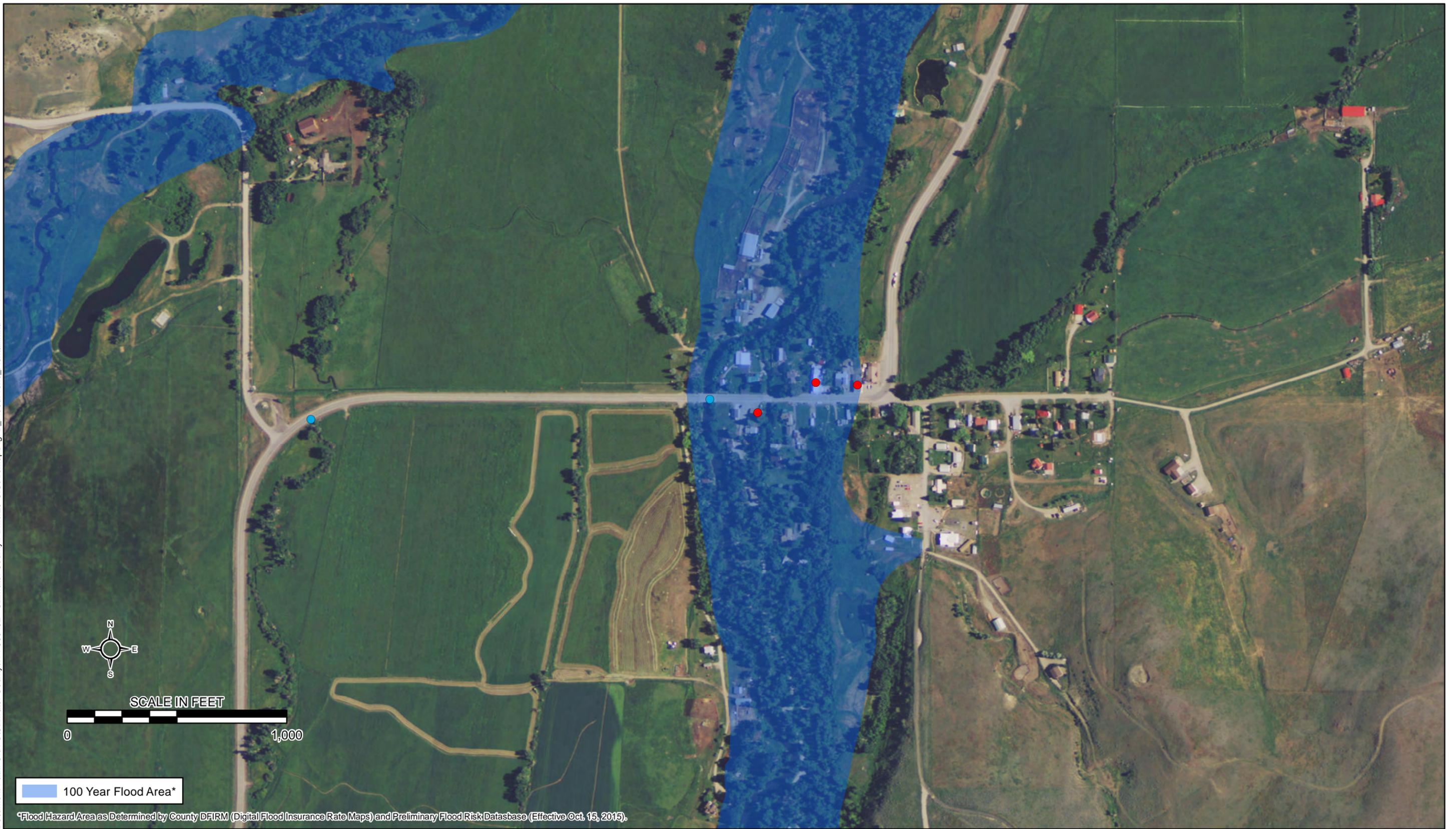
August 2015

Figure 7A

Columbus - Flood Prone Terrain
Stillwater County

Pre-Disaster Mitigation Plan

Document Path: O:\N-S\Stillwater County\114-560482 - Stillwater County_PDM\120-GIS\ArcMap\Fig7B_FloodProne_Fishtail.mxd



*Flood Hazard Area as Determined by County DFIRM (Digital Flood Insurance Rate Maps) and Preliminary Flood Risk Database (Effective Oct. 15, 2015).

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Legend

- Critical Facility
- Bridge

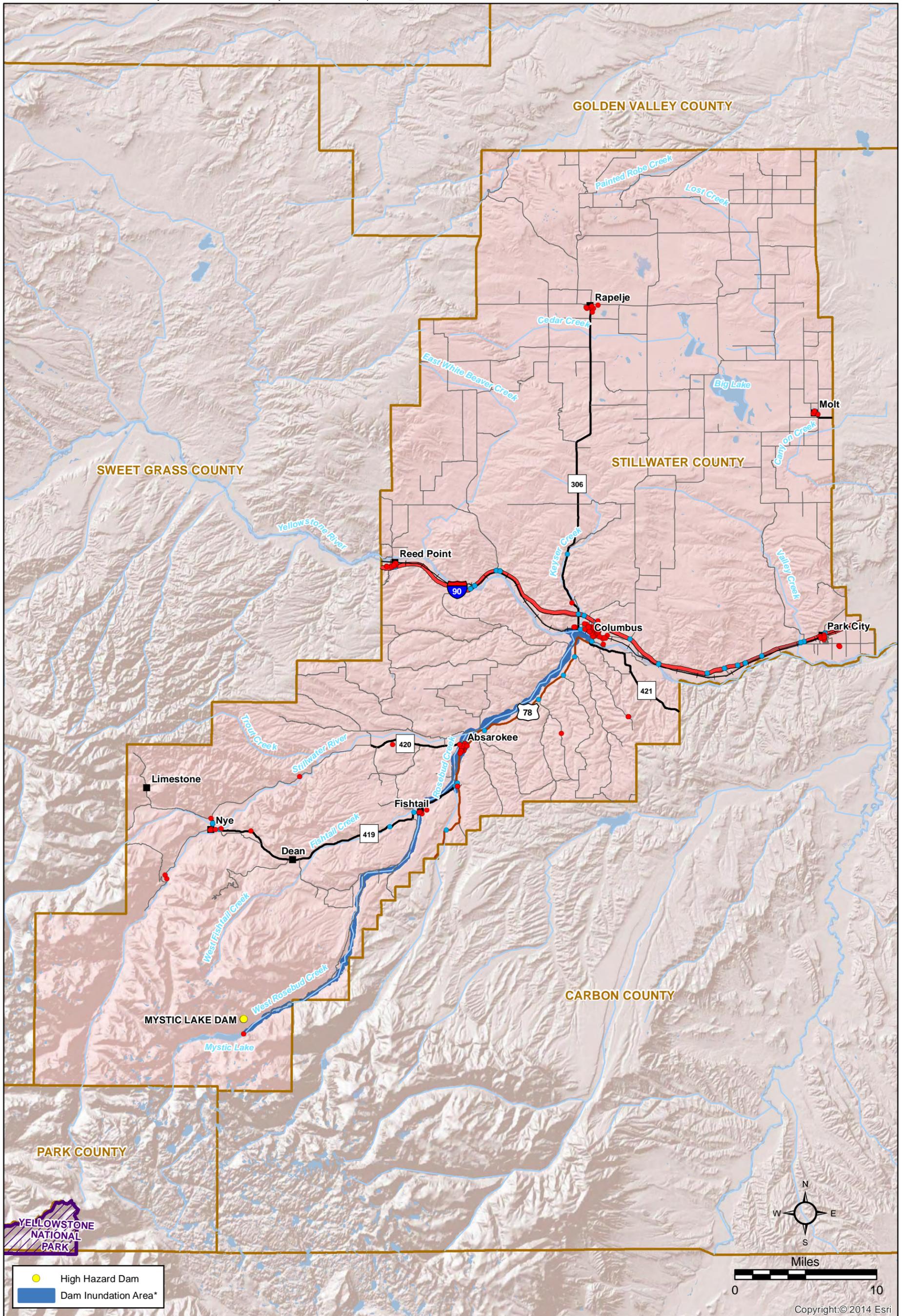


August 2015

Figure 7B

Fishtail - Flood Prone Terrain
Stillwater County

Pre-Disaster Mitigation Plan



*Dam Hazard Area as Determined by Inundation Maps in Emergency Action Plans.



Legend

- | | | | | |
|---------------------|-----------------|-------------------|------------------|------------------|
| ● Critical Facility | — Railroad | — Secondary Route | 🌊 Lake/Reservoir | 🏞️ National Park |
| ● Bridge | — Interstate | — Other Route | 🌊 River/Stream | 🗺️ County |
| ■ Place Name | — Primary Route | | | |



Dam Inundation Area*

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

*Dam Hazard Area as Determined by Inundation Maps in Emergency Action Plans.



- Legend**
- Critical Facility
 - Bridge

August 2015
Figure 8A
Absarokee - Dam Failure Hazard
Stillwater County
Pre-Disaster Mitigation Plan



Dam Inundation Area*

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

*Dam Hazard Area as Determined by Inundation Maps in Emergency Action Plans.



Legend

- Critical Facility
- Bridge

August 2015

Figure 8B

Fishtail - Dam Failure Hazard
Stillwater County
Pre-Disaster Mitigation Plan

4.6 Communicable Disease

CPRI SCORE = 2.95

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, table tops, etc.) to an individual. A pandemic is a global disease outbreak. Human diseases, particularly epidemics, are possible throughout the nation and Stillwater County is not immune to this hazard. In addition, livestock and animal disease could have a devastating effect on the economy and food supply in Stillwater County and beyond. Highly contagious diseases are the most threatening to both populations.

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 and Prevention (2011).

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 (filoviruses [e.g., Ebola, Marburg] and arenaviruses [e.g., 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/bioterrorism agents can infect populations rapidly, particularly through groups of people in close proximity such as schools, assisted living facilities, and workplaces.

Historically, 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. In 1979 and again in late 2003, a flu epidemic hit the U.S. infecting hundreds of people. The swine flu (H1N1) pandemic of 2009 caused a number of fatalities in the country.

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The Montana Department of Public Health and Human Services (DPHHS) manages a database of reportable communicable disease occurrences. The communicable disease summary for Stillwater County between 2003 and 2013 is presented in **Table 4.6-1**.

Table 4.6-1. Stillwater County Communicable Disease Summary

Disease	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
<i>Vaccine Preventable Diseases</i>											
Hepatitis B, chronic	-	-	-	1	-	-	-	-	-	-	-
Hepatitis C, chronic	-	-	5	-	-	-	-	-	-	-	3
Pertussis	-	-	-	-	-	-	1	-	-	7	1
<i>Enteric Diseases</i>											
Campylobacteriosis	-	1	2	4	2	1	4	2	2	2	2
Cryptosporidium	-	-	-	-	-	-	1	-	-	-	1
E Coli	-	-	-	-	-	1	-	2	-	1	-
Giardia	-	1	-	-	1	1	1	-	-	-	-
Meningitis, viral	-	-	-	-	1	-	-	-	-	1	-
Salmonella	-	2	-	1	2	1	3	-	1	-	-
<i>Other Communicable Diseases</i>											
West Nile Virus	3	-	-	4	5	-	-	-	-	-	1
STD	5	13	9	11	8	14	4	14	18	17	6
TOTAL	8	17	16	21	19	18	14	18	21	28	14

Source: Montana DPHHS Communicable Disease Summaries, 2004 – 2014

Notes: STD = Sexually Transmitted Disease

According to the Montana Department of Livestock, known livestock and animal diseases such as Foot and Mouth, Bovine Spongiform Encephalopathy (Mad Cow Disease), Exotic Newcastle, Rabies, Scabies, and Brucellosis could have damaging effects on the livestock population. Losses from these diseases would be devastating and could have an economic effect county-wide.

Vulnerability and Area of Impact

Diseases threaten the population, plants, and animals of Stillwater County as opposed to structures. The entire population is at risk for contracting disease. The more urban nature of Columbus makes it more vulnerable to rapidly spreading and highly contagious diseases than other more rural parts of the County. In addition, tourist visits in the County could introduce a disease to the local population. 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. Given the uncertain nature of diseases, Stillwater County is assumed to have the same communicable disease risk county-wide.

Probability and Magnitude

The probability of an epidemic in Stillwater County is difficult to assess based on history and current data. Individual infectious diseases will likely be reported on an annual basis giving this hazard a probability rating of “highly likely”.

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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). Such a pandemic affecting Stillwater County represents a severe magnitude event. Almost any communicable disease that enters the regional population could overwhelm local health resources as would any rapidly spreading bioterrorism event for which there is no available vaccine or containment capability.

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.

4.7 Drought

CPRI SCORE = 2.95

Description and History

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 but 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.

The NWS issues the following warnings and advisories that relate to drought:

Table 4.7-1. Warning and Advisory Criteria for Drought

Summer 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 when conditions are favorable for heat index values reaching 105 degrees or greater for three days or more.
Heat Warning	Issued when high temperatures are expected to be over 105 degrees and low temperatures are expected to be over 80 degrees for three days or more.

Source: National Weather Service (NWS, 2015)

The State of Montana established a Drought Advisory Committee and developed a Drought Plan to address the hazard. Information from the National Drought Mitigation Center also 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.



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1930's - The 1930's Dust Bowl remains the most highly publicized of past droughts in Montana, but may not necessarily be the worst.

1950's - The mid-1950's saw Montana with a period of reduced rainfall in eastern and central portions of the state. In July of 1956, four counties applied for federal disaster aid due to greatly reduced precipitation amounts since June of the previous year. By November 1956, a total of 20 Montana counties had applied for federal drought assistance.

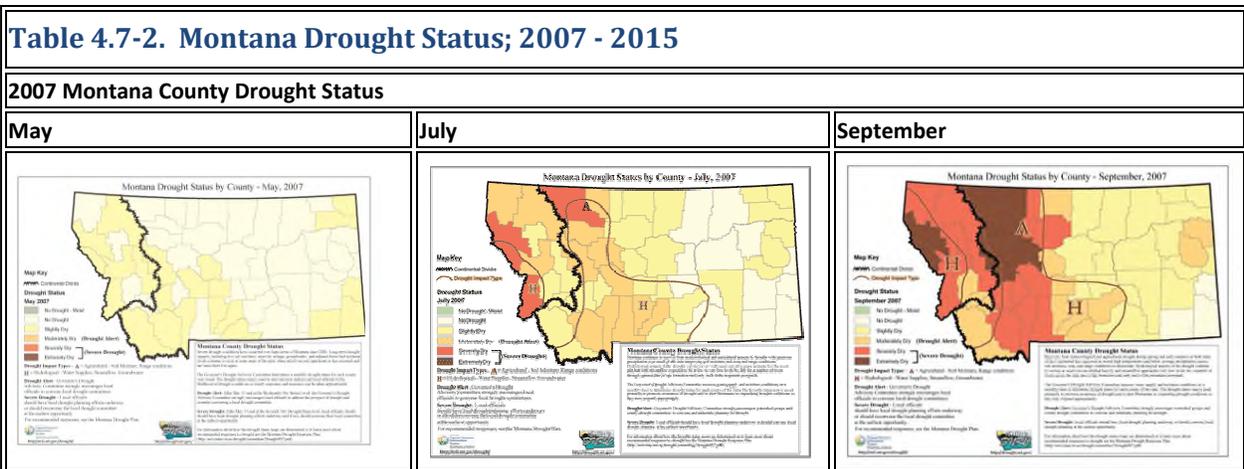
1960's - Montana saw another drought episode in 1961. By the end of June, 17 counties had requested federal disaster designations due to lack of moisture, higher than normal temperatures, and grasshopper infestation. Small grain crops died before maturing, and range grass and dryland hay crops were deteriorating rapidly. Livestock water supplies were at critical levels. In July of 1961, the State's Crop and Livestock Reporting Service called it the worst drought since the 1930s. In 1966, the entire state experienced another episode of drought.

1980's - Another well-established drought episode occurred in eastern Montana in 1980. Grasshopper infestations were seen in isolated areas, little wheat was planted, and large numbers of livestock were sold due to the hay and water shortages. Drought-related economic losses in Montana in 1980 were estimated to be \$380 million. The drought of 1980 continued into the following year. March snow packs were at 50-60 percent of normal, initiating forecasts of critical water shortages later in the season. August of 1984 saw Montana in flames with numerous fires burning out of control. Drought continued to plague the state in 1985 and all 56 counties received disaster declarations.

1990's - During the Drought of 1992, Governor Stan Stephens declared a drought disaster and suspended the issuance of beneficial water use permits by the DNRC from June to October.

2000's - The USDA issued Natural Disaster Determinations for drought for the entire state of Montana for the years 2000 through 2005. This designation entitled counties to low interest loans for producers, small business administration loans, and an Internal Revenue Service provision deferring capital gains.

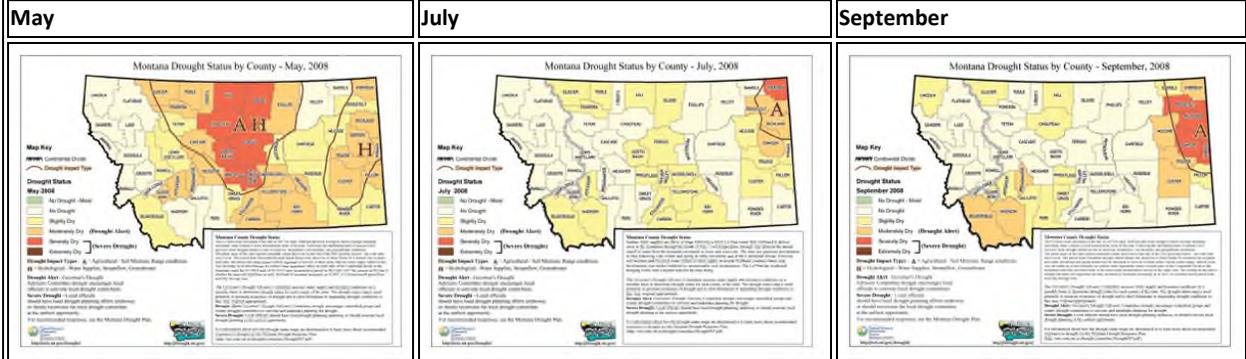
Table 4.7-2 shows the Montana drought status for the period 2007-2015. **Table 4.7-2** summarizes drought conditions in Stillwater County during this period. Since the Stillwater County PDM Plan was completed in 2010, severe drought conditions have not impacted the county.



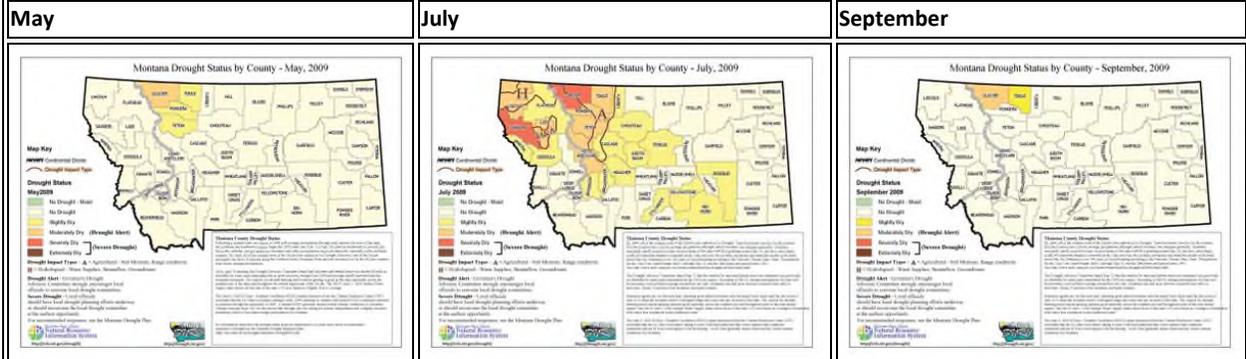
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Table 4.7-2. Montana Drought Status; 2007 - 2015

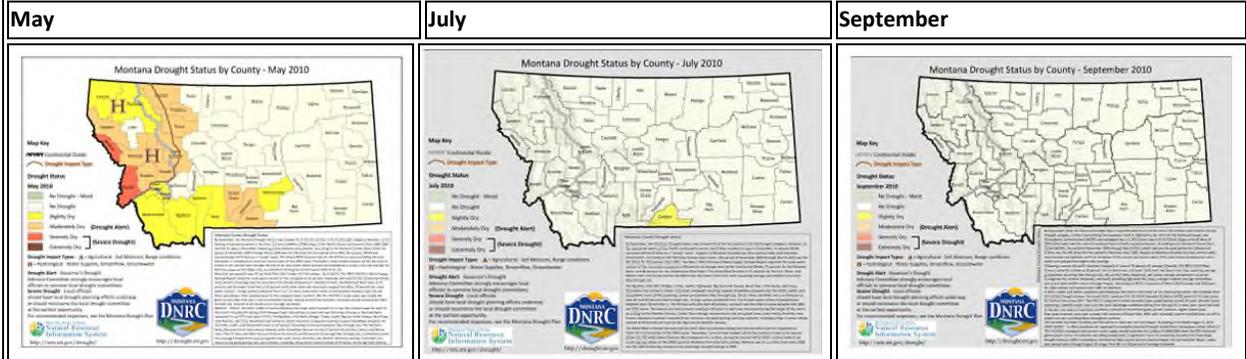
2008 Montana County Drought Status



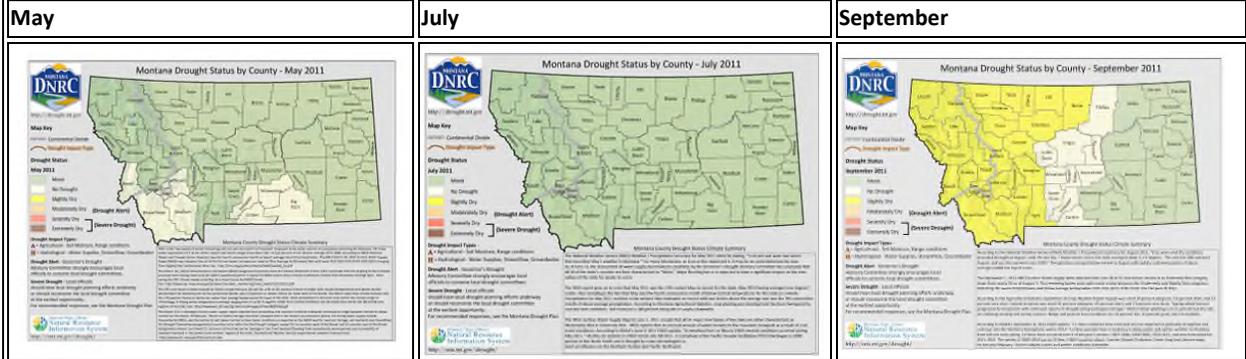
2009 Montana County Drought Status



2010 Montana County Drought Status



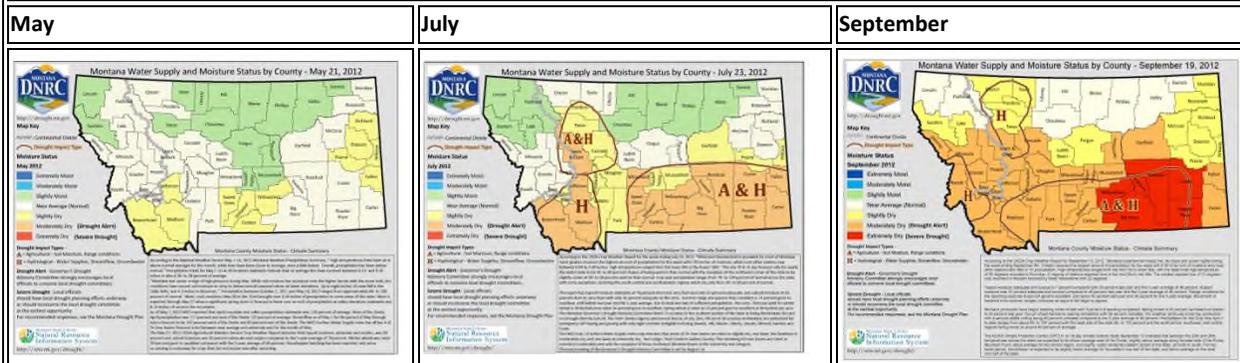
2011 Montana County Drought Status



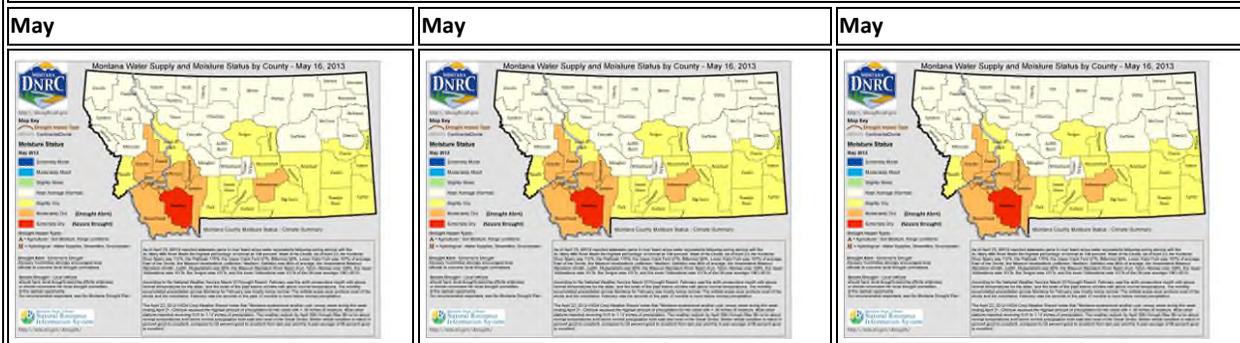
Section 4: Risk Assessment and Vulnerability Analysis

Table 4.7-2. Montana Drought Status; 2007 - 2015

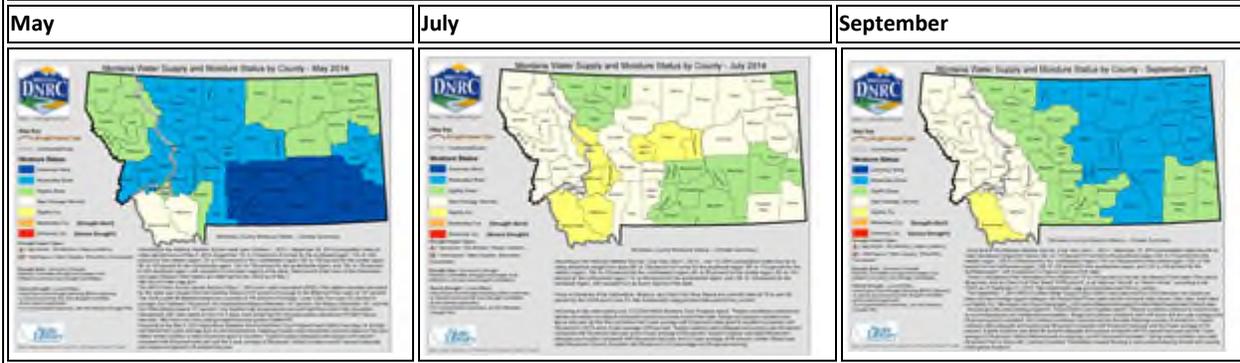
2012 Montana County Drought Status



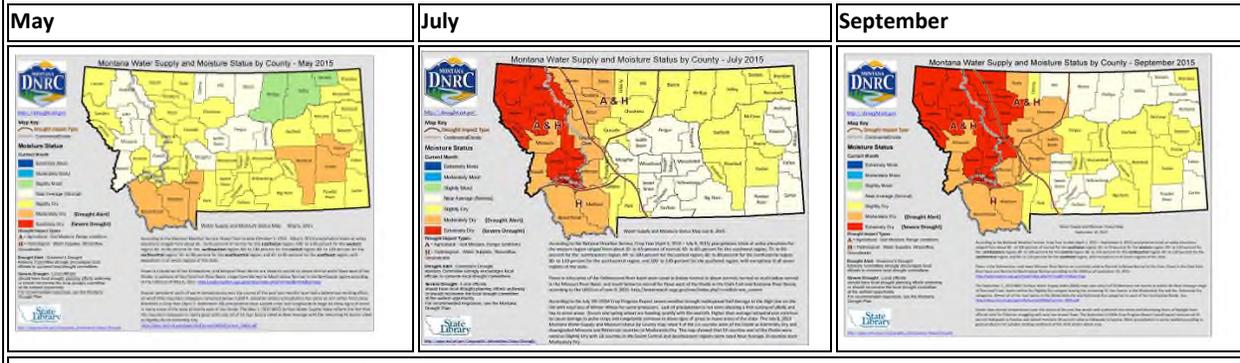
2013 Montana County Drought Status



2014 Montana County Drought Status



2015 Montana County Drought Status



Source: <http://nris.mt.gov/drought/status/>

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Table 4.7-3. Stillwater County Drought Summary

Moisture	Alerts	2007			2008			2009			2010			2011			2012			2013			2014			2015		
		May	July	Sept																								
Extremely Moist																												
Moist																												
No Drought																												
Slightly Dry	Drought																											
Moderately Dry																												
Severely Dry	Severe																											
Extremely Dry																												

Vulnerability and Area of Impact

Drought is a hazard that does not normally cause structural damage but can have significant population and economic effects. Stillwater County communities rely on water for irrigation and public water supplies. A drought or blight could also have significant impacts on the agricultural community. Economic losses could result from 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. A hazard directly related to drought is wildfire. Drought conditions increase the chances that a major wildfire will threaten the community. Unlike many other events, drought evolves slowly, and therefore, the direct impact to the population (i.e. loss of life, injuries) would be low.

Probability and Magnitude

The National Drought Mitigation Center tracks indemnity payments for losses suffered due to drought on a county basis. **Table 4.7-4** presents drought damages for a 25 year period (1989 to 2014) for Stillwater County and the State of Montana.

Table 4.7-4. Drought Insurance Claims; Stillwater County 1989 - 2014

Year	State Total	Stillwater Co.	Year	State Total	Stillwater Co.	Year	State Total	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, 2015; <http://drought.unl.edu/Planning/Impacts/DroughtIndemnityData.aspx>

The 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



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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).

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. The PDM Planning Team ranked drought as having a “highly likely” probability.

Future Development

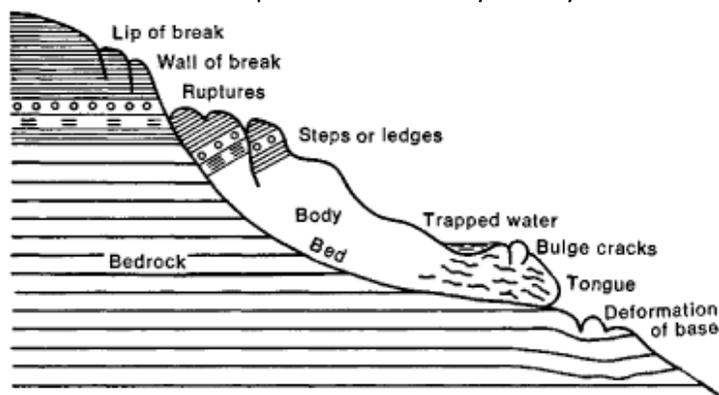
Drought could have an effect on future development with regards to groundwater availability. New domestic water wells and sewer systems could use up more of the groundwater resource, particularly during periods of drought.

4.8 Landslide and Avalanche

CPRI SCORES:
LANDSLIDE = 2.75
AVALANCHE = 1.90

Description and History

A landslide is the movement of a soil and/or rock mass down a slope. Subsidence is the sinking down of land resulting from natural shifts or human activity, frequently causing structural damage to buildings. 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 rain fall or rapid snowmelt. They usually start on steep hillsides as shallow slides that liquefy and



accelerate. The consistency of debris flows 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.

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 be 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.

Steep slopes in excess of 25 percent grade are considered to be unsuitable for subdivisions. Steep slopes are associated with individual topographic features and in transitional areas between land forms. For example, between river valleys and eroded uplands, sides of coulees and lake basins, and among the mountains.

Avalanches come in many shapes and sizes and even small ones can be dangerous. According to the Forest Service National Avalanche Center (<http://www.fsavalanche.org/>), there are three types of avalanches:

1) Slab avalanches: Most people that die in avalanches, die in slab avalanches. Slab avalanches occur when a more cohesive or harder layer of snow sits on top of a less cohesive or softer and weaker layer

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of snow. Sometimes the weak layer can barely support the layers above it and when additional weight like a skier or snow boarder is added to the upper layers, the weak layer collapses and the snowpack fractures and a slab avalanche occurs. Slab avalanches often involve large volumes of fast moving snow. Victims, like the skiers, typically trigger slabs at mid-slope below the fracture line which often makes escape very difficult.

2) Sluffs or loose snow avalanches: Sluffs are cold snow powdery surface slides that typically are the least dangerous type of slide; however, sluffs can and often do injure skiers and boarders by pushing them over cliffs and rock bands in steep terrain.

3) Wet avalanches: Wet slides occur when warm temperatures melt the surface snow layers and saturate them with water. The water weakens the bonds between layers and avalanches often occur. Wet avalanches move more slowly than dry avalanches but they can still be very dangerous.

According to the American Avalanche Associations (www.avalanche.org), no avalanches causing fatalities were recorded in Stillwater County between 1998 and 2014. The Daisy Pass/Cooke City area, immediately to the south in Gallatin County has had numerous avalanche fatalities.

Vulnerability and Area of Impact

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 believes that moisture from heavy rainstorms seeped behind wedges that were holding large sections of rock together, causing the slide. The rock slide that 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 are concerned about a large section of rock still hanging and if there was funding to do what was necessary to shore up the area. County officials stated that it is a wait and see game and while some options have been discussed generally, no detailed plans will be made until the area is stable enough for a closer look. (Unstable rock slide to keep Stillwater River Road closed, Stillwater County News, June 11, 2015).



Landslide events in Stillwater County to date have not warranted a disaster declaration.

Avalanches threaten the safety of recreationists, primarily in back country locations. There have been over 100 fatalities in Montana due to avalanches from 1950 to 2013. In rare instances, avalanches can threaten structures.

Probability and Magnitude

A GIS layer developed by the U.S. Geological Survey (USGS) was used to evaluate landslide risk (**Figure 9**). The USGS developed the landslide hazard map by evaluating formations shown on the geologic map

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of the United States as being of high, medium, or low susceptibility to landsliding and thereby classifying the formations as having high, medium, or low landslide incidence. Susceptibility to landsliding was defined as the probable degree of response of the areal rocks and soils to natural or artificial cutting or loading of slopes or to anomalously high precipitation. In areas of continental glaciation, additional data were used to identify surficial deposits that are susceptible to slope movement (USGS, 1982). Only the high susceptibility formations were used in the PDM analysis. These landslide-prone areas were intersected with the critical facility and MDOR parcel datasets to determine exposure. Population exposure was calculated by the percent of the hazardous material buffer in each census block. **Table 4.8-1** presents the results of the landslide vulnerability analysis. It should be noted that the recent landslide in Stillwater County is not within the area mapped as highly susceptible to landslide in the PDM analysis.

Table 4.8-1. Stillwater County Vulnerability Analysis; Landslide

Category	Stillwater County (balance)	Columbus, Town
Residential Property Exposure \$	\$202,032,243	\$65,383,045
# Residences At Risk	1,452	687
Commercial, Industrial & Agricultural Property Exposure \$	\$11,503,970	\$46,507,380
# Commercial, Industrial & Agricultural Properties At Risk	173	140
Critical Facilities Exposure Risk \$	\$32,755,749	\$88,382,960
# Critical Facilities At Risk	35	70
Bridge Exposure \$	\$5,023,628	\$0
# Bridges At Risk	28	0
Persons At Risk	3,416	1,893
Persons Under 18 At Risk	798	492

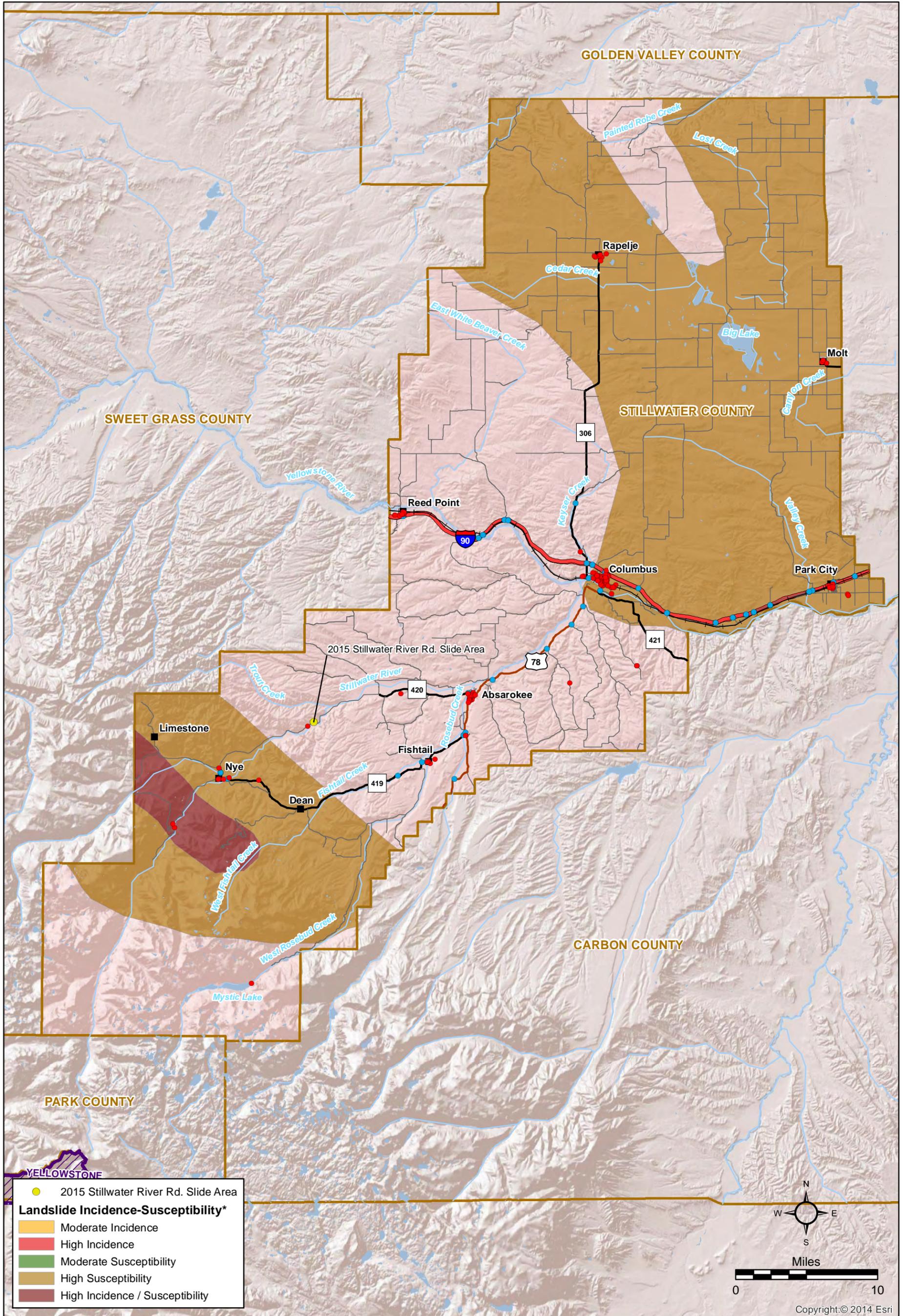
The GIS analysis indicates that about 6,355 acres in Stillwater County (0.55 percent) are located on land rated as having a high susceptibility for landslide incidence. This includes 2,139 residences, 313 commercial, industrial, and/or agricultural buildings, and 105 critical facilities. The Landslide Section in **Appendix C** presents supporting documentation from the vulnerability analysis.

Based on the frequency of small landslide and slope failure events in Stillwater County, the Planning Team rated the probability as “likely”. The probability of a significant avalanche was rated as “possible”.

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 avalanches, 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 (2007) 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.



*Landslide Hazard Area as determined by the USGS for Moderate and High Incidence/Susceptibility categories; <http://landslides.usgs.gov/learning/nationalmap/>.



Legend

- Critical Facility
- Railroad
- Secondary Route
- Lake/Reservoir
- National Park
- Bridge
- Interstate
- Other Route
- River/Stream
- County
- Place Name
- Primary Route

4.9 Terrorism, Civil Unrest and Violence

CPRI SCORE: 2.20

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 fire bombs 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.

Lone gunman shootings are another form of terrorism. In the U.S., lone gunman shooting have occurred at schools, movie theaters, 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, whether firearms should be allowed in the classroom and whether there should be stricter gun control. Stillwater County has a sworn police officer in the public schools who has undergone lone shooter training.

Eco-terrorism is the use or threatened use of violence of a criminal nature against innocent victims or property by an environmentally-oriented, subnational group for environmental-political reasons, or aimed at an audience beyond the target, often of a symbolic nature. An example of eco-terrorism are the Rainbow Gatherings which have been held in Montana several times in the past decade. Rainbow Gatherings started in the late 1960s as an outgrowth of the anti-war and hippy movements and have occurred every July since 1972 in a different US National Forest, bringing together upwards of 10,000 "Rainbows". Environmental impact and crime are difficulties associated with Rainbow Gatherings, and has resulted in strained relations between Rainbow Gathering participants and local communities. Media coverage is often unfavorable, focusing on drug use, nudity, assaults, fugitives, serious traffic charges such as drunken driving and the countercultural aspects of the assemblage. Rainbow gatherings have been held in Montana several times in the last decade.

Civil unrest and violence typically occur on a smaller scale 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. Violence can be small scale, such as domestic violence, or larger and require significant government response.

In early March 1995, rancher William Stanton, a follower of the Freemen movement, was sentenced by a judge in Roundup, Montana, to a 10-year prison term for criminal syndicalism -- the advocacy of crime, violence, or property damage for political ends -- related to Freemen activities. On the heels of Stanton's sentencing, and in an apparent show of support for the Freemen, John Trochmann and six of his followers embarked on a 500-mile journey to Roundup, armed with an arsenal of weapons. "I believe the men were here to attempt to capture or kill us" the Musselshell County Attorney told a local paper. The seven men were arrested on charges of carrying concealed weapons and felony intimidation. A search of their vehicle revealed a collection of handguns and rifles, communications equipment,

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thousands of rounds of ammunition, quantities of gold and silver, and \$80,000 in cash. Charges against all but two of the men were dropped in late March after a state prosecutor concluded that there was insufficient evidence to support felony charges (*Freemen Leader a Man with a Mission*, Chicago Tribune, April 15, 1996). In response to the threats, Musselshell County Commissioners placed signage prohibiting weapons in the courthouse and installed a metal sheet on the backside of the judge's bench.

Garfield County made national news during the Montana Freemen crisis. In the early spring of 1996, hundreds of FBI agents surrounded the Ralph Clark ranch complex near Jordan, Montana for a total siege of 81 days. Nearly 30 people inside were of a radical anti-government and racist religious sect who had written bad checks and threatened judges, among other things.

According to the Southern Poverty Law Center, an organization devoted to tracking hate groups in the United States, 12 hate groups were active in Montana during 2012, including: White Nationalist organizations in Whitefish and Kalispell; Neo-Nazi groups in Billings; Christian Identity groups in Big Sandy, Billings and Great Falls; and Ku Klux Klan groups in Great Falls and Polson. Historically, there has not been a terrorism event in Stillwater County; however, a future incident cannot be ruled out.

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, an organization that tracks hate groups in the U.S., no hate groups have been active in Stillwater County.

There is concern that Stillwater County is becoming, with more regularity, a location for events that draw thousands of participants and, as such, could become a target for terrorists. Such events have included: Cycle Hill Climb, Sheep Drive, Absarokee Days, Fishtail Days, Cycle Greater Yellowstone, and Boat Float. There is also the potentiality the County could be the location for motorcycle rallies, a Rainbow Gathering, and large music events.

Probability and Magnitude

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 the actual machinery of the information infrastructure, remotely disrupting the information technology underlying the Internet, government computer networks, or 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.

Section 4: Risk Assessment and Vulnerability Analysis

Planning Team members rated the probability of a significant terrorism incident in Stillwater County as “possible”.

Future Development

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

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. Neither the County nor the Town of Columbus have repetitive loss properties associated with other hazards. Annual loss estimates are presented for each hazard where damage data is available. Future development projects in Stillwater County are discussed as they relate to the hazard areas.

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. Annualized loss was computed for the hazards where damage data was available. *Section 4.1* presents the methodology for loss estimation calculations. **Tables 4.10-1 and 4.10-2** present annual loss for the various hazards for residential, commercial (including industrial and agricultural buildings), and critical facilities in the County and Town of Columbus. **Appendix C** contains supporting information.

Composite Hazard Map and Future Development

Figures 10 and 10A present the composite of hazard prone areas in the County and Town of Columbus. The Stillwater County and Town of Columbus Growth Policies (2007 and 2012, respectively), as well as the County's Overall Economic Development Plan (2015) outline areas for where future development may take place over the next 10 to 15 years. Where locations are known, these areas are shown on the composite hazard maps (**Figure 10 and 10A**) and are listed below. These maps can be used to help locate future projects outside hazard-prone areas.

- Absarokee – Elderly Assisted Living Facility
- Columbus – New School
- Columbus – New Library & County Community Center
- Columbus – New Business Park
- Columbus – New travel plazas and motels at the interchange areas of Interstate-90
- Columbus – New Subdivision north of Centennial/west of Quarry streets
- Park City – New travel plazas and motels at the interchange areas of Interstate-90
- Rapelje – New Interstate-90 interchange at Highway 306 (Rapelje Road)
- Reed Point – Auto/truck plaza at Interstate-90 interchange

Several infrastructure projects are on-line to be built in Stillwater County, including:

- A 100kV transmission line from the Columbus Rapelje Substation to a new substation near Nye is proposed by NorthWestern Energy
- A 30-inch natural gas pipeline across northern Stillwater County is proposed by Altamont Gas Transmission Company.
- Wind farm

Table 4.10-1. Hazard Vulnerability Summary; Stillwater County (less 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
Wildfire	\$320,954,896	2,135	\$25,706,091	220	\$42,129,632	42	\$7,672,858	42	4,710	951
Hazardous Material Incidents / Transportation Accidents	\$100,147,052	956	\$21,548,455	156	\$40,372,632	74	\$9,759,534	47	4,144	929
Severe Weather	\$430,493,951	3,091	33,051,089	376	\$151,261,736	158	\$10,630,622	55	7,224	1,496
Flooding	\$150,168,840	972	\$6,229,662	74	\$132,996	3	\$4,142,112	18	3,857	802
Dam Failure	\$69,450,846	564	\$12,704,117	88	\$23,332,777	25	\$1,302,096	5	1,878	400
Communicable Disease	\$430,493,951	3,091	33,051,089	376	\$151,261,736	158	\$10,630,622	55	7,224	1,496
Drought	\$430,493,951	3,091	33,051,089	376	\$151,261,736	158	\$10,630,622	55	7,224	1,496
Landslide	\$202,032,243	1,452	\$11,503,970	173	\$121,138,709	105	\$5,023,628	28	3,416	798
Terrorism, Violence, Civil Unrest	\$430,493,951	3,091	33,051,089	376	\$151,261,736	158	\$10,630,622	55	7,224	1,496

Note 1: Values for all critical facilities were not available; therefore, exposure value reported may be lower than actual amount.

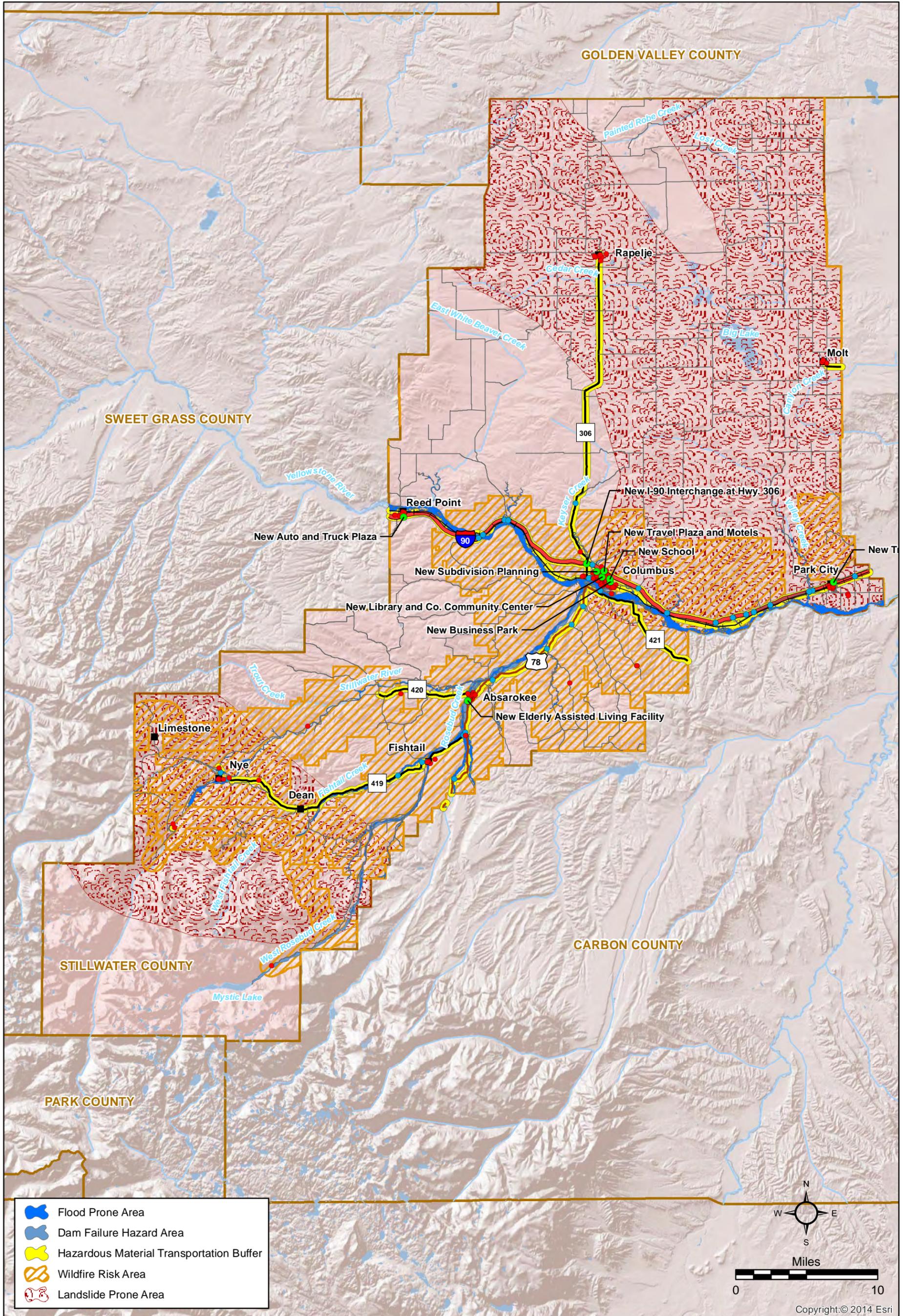
Note 2: It should be noted that there are some inherent inaccuracies using a percentage of census block population to compute the number of individuals living in the hazard area. More persons than actually reside in the hazard area may be calculated where census blocks are large.

Table 4.10-2. Hazard Vulnerability Summary; Town 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
Wildfire	\$65,383,045	687	\$46,507,380	140	\$89,519,263	74	\$0	0	1,893	492
Hazardous Material Incidents / Transportation Accidents	\$43,665,248	489	\$45,506,202	132	\$48,599,659	51	\$0	0	1,491	392
Severe Weather	\$65,383,045	687	\$46,507,380	140	\$89,748,763	77	\$0	0	1,893	492
Flooding	\$2,914,724	38	\$8,872,961	27	\$0	1	\$0	0	197	48
Dam Failure	\$719,297	7	\$3,708,643	3	\$0	0	\$0	0	44	7
Communicable Disease	\$65,383,045	687	\$46,507,380	140	\$89,748,763	77	\$0	0	1,893	492
Drought	\$65,383,045	687	\$46,507,380	140	\$89,748,763	77	\$0	0	1,893	492
Landslide	\$65,383,045	687	\$46,507,380	140	\$88,382,960	70	\$0	0	1,893	492
Terrorism, Violence, Civil Unrest	\$65,383,045	687	\$46,507,380	140	\$89,748,763	77	\$0	0	1,893	492

Note 1: Values for all critical facilities were not available; therefore, exposure value reported may be lower than actual amount.

Note 2: It should be noted that there are some inherent inaccuracies using a percentage of census block population to compute the number of individuals living in the hazard area. More persons than actually reside in the hazard area may be calculated where census blocks are large.



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August 2015

Figure 10

Hazard Composite
Stillwater County

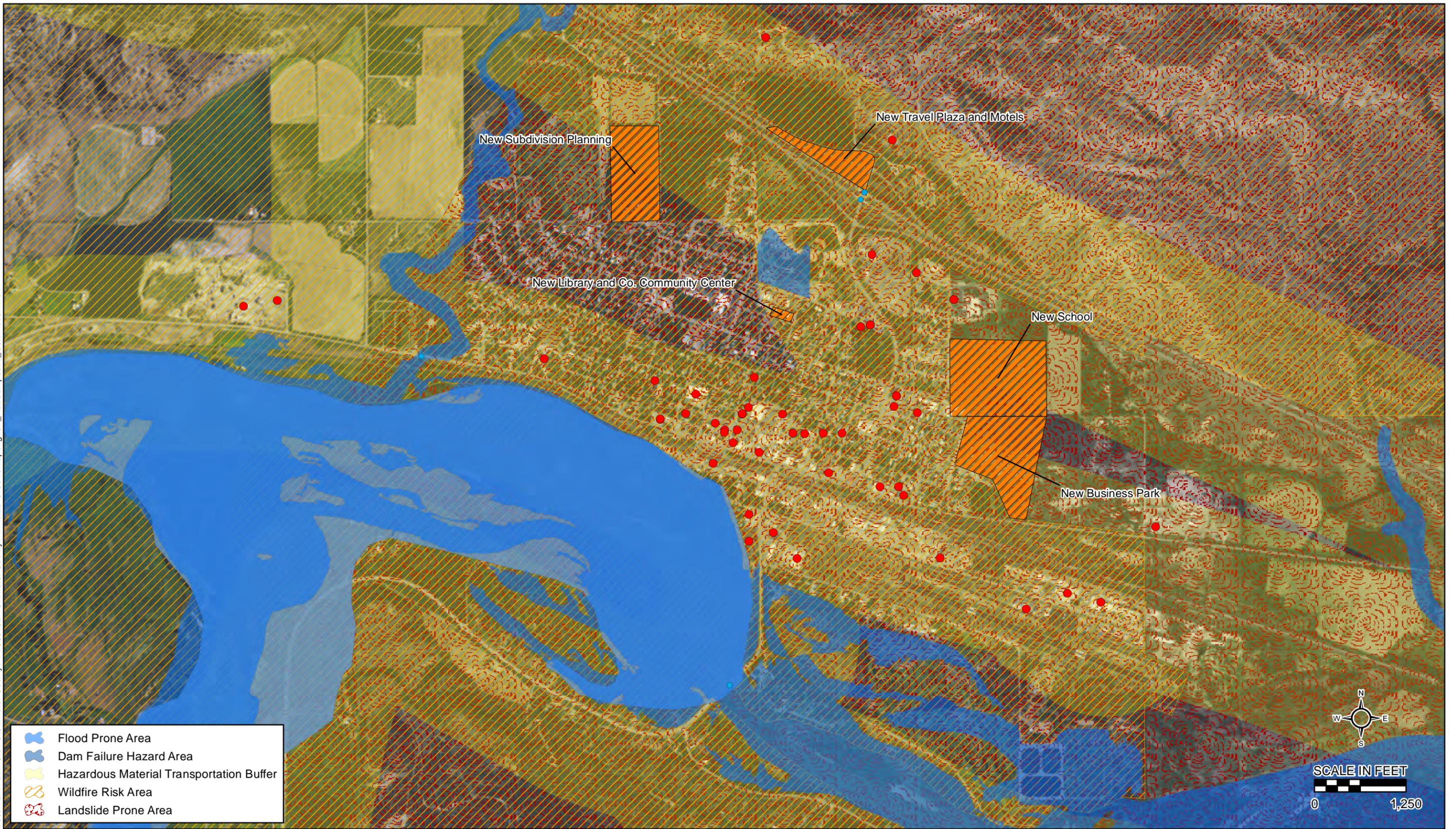
Pre-Disaster Mitigation Plan



Legend

- | | | | | |
|--|---|---|--|--|
| ● New Development | ■ Place Name | — Interstate | — Secondary Route | — Lake/Reservoir |
| ● Critical Facility | — Railroad | — Primary Route | — Other Route | — River/Stream |
| ● Bridge | | | | County |

Document Path: O:\N-S\Stillwater County\11-4-560-482 - Stillwater County_PDM\120-GIS\ArcMap\Fig10A_HazComposite_Columbus.mxd



-  Flood Prone Area
-  Dam Failure Hazard Area
-  Hazardous Material Transportation Buffer
-  Wildfire Risk Area
-  Landslide Prone Area

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



- Legend**
-  Critical Facility
 -  Bridge
 -  Future Development

August 2015
Figure 10A
 Hazard Composite - Columbus
 Stillwater County
Pre-Disaster Mitigation Plan

Section 4: Risk Assessment and Vulnerability Analysis

Table 4.10.3. Future Development Summary

Proposed Project	Hazard Areas							
	Wildfire	Haz-Mat Incidents	Severe Weather	Flooding/Dam Failure	Communicable Disease	Drought	Landslide	Terrorism
Absarokee – Elderly Assisted Living Facility	Yes	No	Yes	Yes	Yes	Yes	No	Yes
Columbus – New School	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Columbus – New Library & County Community Center	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Columbus – New Business Park	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Columbus – New travel plazas and motels at I-90 interchange	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Columbus – New Subdivision N of Centennial /W of Quarry St.	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Park City – New travel plazas and motels at I-90 interchange	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Rapelje – New Interstate-90 interchange at Hwy 306	Yes	Yes	Yes	No	Yes	Yes	No	Yes
Reed Point – Auto/truck plaza at Interstate-90 interchange	No	Yes	Yes	No	Yes	Yes	No	Yes

SECTION 5. MITIGATION STRATEGIES

This section presents mitigation actions for Stillwater County to reduce potential exposure and losses from natural, man-made, and technological hazards. The PDM Planning Team reviewed the Risk Assessment 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. The 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. Examples of previous and ongoing actions and projects include the following:

- In 2014, a Risk Map project was completed in Stillwater County. Through Risk MAP, FEMA provides communities with updated Flood Insurance Rate Maps and Flood Insurance Studies that focus on the probability of flood and that show where flooding may occur. Flood problem areas, identified by this study, are included as mitigation projects in this PDM Plan.
- The County and Town of Columbus participate in the National Flood Insurance Program, which requires the adoption of FEMA floodplain mapping and certain minimum construction standards for building within the floodplain.
- The Stillwater County Road and Bridge Department has made repairs and upgrades to culverts around the county to mitigate the flood hazard. Between 2010 and 2015, culverts were repaired or upgraded at approximately 110 locations totaling over \$238,500 including labor, equipment, and material costs.
- The Town of Columbus completed Project 3.2.1, to develop a storm drainage plan for Columbus.
- Stillwater County completed Project 1.2.4, to expand the warning system for failure of Mystic Lake Dam to areas further downstream.
- Stillwater County completed Project 1.2.2, to add Red Flag Warnings to the suite of projects broadcast over the Emergency Alert System.

- The Stillwater County Commissioners passed the county's first burn permit system in June 2015. Dispatchers are now able to check the location called in and immediately know if fire crews need to respond or if it is simply a controlled burn. A limited number of circumstances can cause the county to prohibit burning on any given day, including being in Stage 1 or Stage 2 Fire Restrictions and being under NOAA red flag warning conditions.
- Hazardous fuel project from 2010 to 2015 included 1,436.5 acres at the following locations:
 - Bearpaw Ranch – two projects totaling 13 acres;
 - Beartooth Mountain Christian Ranch 1 – four projects totaling 21 acres;
 - Beartooth Ranch – one project for 1,200 acres;
 - Cathedral Mountain Ranch – annual workday totaling 10 acres;
 - Countryman Creek Estates – four projects totaling 40 acres;
 - Eagle Mountain Subdivision – three projects for 16 acres;
 - Hearts & Diamonds Subdivision – six projects totaling 21 acres;
 - Pinecrest Estates Phases 1 & 2 – 11 projects totaling 36 acres;
 - Shane Creek Ranch – one project for 14 acres;
 - Sutherland Subdivision – one project for 3 acres;
 - Yellowstone River Landowners Association – three project totaling 26 acres; and,
 - Yellowstone River Ranch – three projects totaling 11 acres.

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).

FEMA defines **Goals** as general guidelines that explain what should be achieved. Goals are usually broad, long-term, policy statements, and represent a global vision.

FEMA defines **Objectives** as strategies or implementation steps to attain mitigation goals. Unlike goals, objectives are specific and measurable, where feasible.

FEMA defines **Mitigation Actions** as specific actions that help to achieve the mitigation goals and objectives.

The 2010 Stillwater County PDM Plan had three goals; one specific to development of a comprehensive mitigation program, one for wildfire mitigation, and one for mitigation of all other hazards. These goals were based on the risk assessment results, discussions, research, and input, existing authorities, polices, programs, resources, stakeholders and the public. For this 2015 update, the Planning Team reviewed the mitigation goals during a mitigation workshop and public meeting and determined that the original goals should be retained.

Mitigation objectives developed for the original PDM Plan were generally retained for this 2015 update. Two objectives were reworded to more accurately focus on the County’s capability to mitigate the hazard: Objective 3.1 on hazardous-material incidents, and Objective 3.3 on communicable disease. Two objectives were eliminated from the plan; Objective 3.5 stating “reduce chances of mass casualty transportation accidents due to large game in the roadway” was deleted because this is a Montana Dept. of Transportation initiative and is outside the County’s authority; and, one objective pertaining to the earthquake hazard was deferred to **Appendix D** as it is a low ranking hazard. Mitigation objectives for three additional hazards were added to the 2015 strategy: severe weather (Objective 3.5), landslide (Objective 3-6); and terrorism, violence, and civil unrest (Objective 3-7) as these hazards were determined to be of higher priority than in 2010. Mitigation goals and objectives for the 2015 PDM Plan are presented in **Table 5.3-1**.

Table 5.3.1. Goal and Objective Summary

Goal Number	Objective Number	Goal/Objective Statement
1		Reduce population and property losses through comprehensive mitigation programs.
	1.1	Provide the public, businesses, and local officials with ample educational opportunities regarding hazard mitigation.
	1.2	Increase the situational awareness and warning of imminent or occurring hazards.
	1.3	Protect critical infrastructure and facilities to reduce future losses and ensure continued delivery of essential services.
	1.4	Mitigate the impact of hazards on future development through land use and building regulations.

Table 5.3.1. Goal and Objective Summary

Goal Number	Objective Number	Goal/Objective Statement
2		Protect the public, firefighters, communities, and property from losses due to wildfire.
	2-1	Decrease the probability of structure ignitions in the wildland urban interface.
	2-2	Improve local understanding of the wildfire hazard.
3		Utilize hazard-specific strategies to reduce future losses from particular hazards.
	3-1	Minimize impacts of hazardous material spills.
	3-2	Minimize physical and financial losses from flood and dam failure.
	3-3	Reduce and minimize the impacts of human diseases.
	3-4	Reduce the impacts to the agricultural community from drought.
	3-5	Minimize structural losses from severe weather.
	3-6	Reduce impacts from landslide and avalanche.
	3-7	Decrease the probability of impacts from terrorism, violence, and civil unrest.

5.4 Capability Assessment

The 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 Town staff who implement the legal and regulatory requirements used to manage growth (zoning, building codes, subdivision regulations, and floodplain ordinances).

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 County to support hazard mitigation provide the funding to implement the Stillwater County mitigation strategy.

5.4.1 Summary of Programs and Resources Available to Support Mitigation

A number of programs and resources in Stillwater County support mitigation efforts. These are described below.

Beartooth Resource Conservation & Development

Stillwater County participates in the Beartooth Resource Conservation & Development (RC&D) Area Economic Development District. Beartooth RC&D provides a pre-disaster planning and fuels reduction program for communities and their outlying housing and residential developments. Beartooth has obtained funding from federal and state sources to assist local planners and home owners with this process, and is supported by a network of resources including professionals from various agencies and organizations.

Beartooth RC&D enters into agreements with individuals or groups to cost-share the work required to reduce the amount of hazardous fuels around structures, along roadways, and in areas that protect life and property. Professional fuels reduction planning and mitigation advice is provided at no cost through

a fuels specialist, as well as local fire department officials. A 75 percent cost-share funding is also provided to remove fuels from around homes and structures.

National Flood Insurance Program (NFIP)

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 (CRS) 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.

5.4.2 Administrative and Technical Capabilities

Stillwater County's administrative and technical capabilities to implement mitigation projects include community planners, engineers, floodplain managers, GIS personnel, emergency managers, and financial, legal and regulatory requirements. Expertise from local and regional planning partners also contribute to the County's mitigation capabilities. Several of these entities are described below.

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. Stillwater County DES 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.

Stillwater County DES staff includes one full time person who devotes 100 percent of their time to emergency management. The position is 50 percent federally funded through the Emergency Management Performance Grant program and 50 percent funded by the county. In addition, Stillwater County DES has one part-time employee who works 20 hours a week. This position is 25 percent federally funded and 75 percent county funded.

Local Emergency Planning Committee

The mission of the Stillwater County Local Emergency Planning Committee (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 at the Stillwater County Courthouse in Columbus.

Stillwater County Fire Council

The mission statement of the Stillwater County Fire Council 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 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, Carbon, and Yellowstone 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.

Local Planning Boards

The City-County Planning Board is responsible for planning efforts within the Town of Columbus and their jurisdictional area adjacent to the Town. County Planning Boards focuses their planning on all jurisdictions in the County outside of the Town's jurisdiction. The Planning Board's functions include subdivision review and community planning. The City-County Planning Board acts as the Columbus Zoning Commission. These entities handle review and update of regulatory requirements specific to growth in the county.

Federal Land Management Agencies

The U.S. Forest Service is involved in planning activities for the land area within Stillwater County which is on the Custer National Forest. The Soil Conservation Service works with area farmers and ranchers on individual management plans to mitigate the effects of drought. The federal Fish and Wildlife Service is involved with plans for the two wildlife refuges in northern Stillwater County.

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 through 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.

FEMA, 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. Projects must fit into an overall mitigation strategy for the area identified as part of a local planning effort. All applicants must have a FEMA-approved Hazard Mitigation Plan (this plan).

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 Montana DES 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.

Flood Mitigation Assistance (FMA) Program. The FMA combines the previous Repetitive Flood Claims and Severe Repetitive Loss Grants into one 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. At minimum, a FEMA-approved local flood mitigation plan is required before a project can be approved. FMA funds are distributed from FEMA to the state. Montana DES serves as the grantee and program administrator for FMA.

FEMA, Pre-Disaster Mitigation Competitive (PDMC) Grant Program. The PDM program is an annually funded, nationwide, competitive grant program. No disaster declaration is required. Federal funds will cover 75 percent of a project’s cost up to \$3 million. As with the HMGP and FMA, a FEMA-approved local Hazard Mitigation Plan is required to be approved for funding under the PDM program.

FEMA, Readiness, Response and Recovery Directorate, Fire Management Assistance Grant Program. This 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.

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. Fish & Wildlife Service, Rural Fire Assistance Grants. Each year, the U.S. Fish & Wildlife Service (FWS) 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. Bureau of Land Management (BLM), Community Assistance Program. BLM provides funds to communities through assistance agreements to complete mitigation projects, education and planning within the WUI. More information: http://www.blm.gov/nifc/st/en/prog/fire/community_assistance.html

Fire Management Assistance Program. This program is authorized under Section 420 of the Stafford Act. It allows for the mitigation, management, and control of fires burning on publicly or privately owned forest or grasslands that threaten destruction that would constitute a major disaster. More information: <http://www.fema.gov/fire-management-assistance-grant-program>

U.S. Department of Agriculture, Community Facilities Loans and Grants. Provides grants (and loans) to cities, counties, states and other public entities to improve community facilities for essential services to rural residents. Projects can include fire and rescue services; funds have been provided to purchase fire-fighting equipment for rural areas. No match is required. More information: http://www.usda.gov/wps/portal/usda/usdahome?navid=GRANTS_LOANS

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>

Hazardous Materials Emergency Preparedness Grants. Grant funds are passed through to local emergency management offices and HazMat teams having functional and active LEPC groups. 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/>

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, as 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/>

Volunteer Fire Assistance 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 and or county 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>

Conservation District Grants. This program provide funds to increase conservation district employee's hours to assist in planning, securing funding, and implementing programs that improve public outreach, improve conservation district administrative capabilities, and implement conservation plans. There is a \$10,000 award amount. 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 Wildland Urban Interface Grant Program. Each year, the Montana Department of Natural Resources and Conservation (DNRC) accepts proposals from partners around the state for submission to the National Fire Plan competitive process. The State 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, 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>

5.5 Mitigation Strategy Development

This subsection discusses the identification, prioritization, analysis and implementation plan of mitigation actions for Stillwater County and the Town of Columbus.

5.5.1 Mitigation Strategy Update and Reconciliation

The Planning Team reviewed the list of mitigation actions (projects) from the 2010 PDM Plan and determined which were complete, should be deleted, or reworded for the 2015 mitigation strategy during a mitigation workshop held in Columbus on August 5, 2015. **Appendix C** 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 recent 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.
- **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.

In consideration of federal and state mitigation guidance, the PDM 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 countywide and regional efforts to build greater local mitigation capabilities.

Mitigation actions included in the 2015 Stillwater County mitigation strategy are presented in **Table 5.5-2** at the end of this Section. **Appendix D** 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 PDM Plan 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 applied in 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 Hazard Mitigation Grant Program (HMGP) and Pre-Disaster Mitigation (PDM) 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** present the scoring of each project.

Table 5.5-1. Cost-Benefit Scoring Matrix

Score	Population Protected	Property Protected	Project Feasibility	Cost
High	5	5	5	1
Medium	3	3	3	3
Low	1	1	1	5

After considering all mitigation projects, the PDM 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 PDM Planning Team reviewed the projects and assigned a corresponding county or town 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; “long-term” for projects to be completed in 5 or more years; and “Year 1-5” for projects which will span the entire planning period.

Implementation details are shown in **Table 5.5-3** and in the mitigation action plans in **Appendix D**. The Stillwater County DES Coordinator will be responsible for mitigation project administration.

Table 5.5-2. Stillwater County 2015 Mitigation Strategy

Goal	Objective	Project	Hazard	Jurisdiction	Benefit-Cost Ranking/Score	Priority
Goal 1 - Reduce population and property losses through comprehensive mitigation programs.	Objective 1.1 - Provide the public, businesses, and local officials with ample educational opportunities regarding hazard mitigation.	Project 1.1.1 - Conduct workshops and distribute information on wildfire hazard reduction and seasonal fire danger to rural property owners.	Wildfire	Stillwater Co., Columbus	High/18	Medium
		Project 1.1.3 - Distribute winter weather information in welcome packets to new residents.	Severe Weather	Stillwater Co., Columbus	Medium/12	Medium
		Project 1.1.7 - Target potentially affected citizens with information about the dam failure risk in their area and include information on exercises.	Dam Failure	Stillwater Co., Columbus	Medium/16	Medium
		Project 1.1.8 - Distribute information about building in the floodplain.	Flooding	Stillwater Co., Columbus	Medium/16	Medium
		Project 1.1.9 - Promote immunizations and disseminate information on other public health topics.	Communicable Disease	Stillwater Co., Columbus	Medium/16	Medium
		Project 1.1.10 - Partner with surrounding counties and present workshops and presentations focused on defensible space and FireWise principles targeting county planning staff, county planning boards, architects, engineers, and realtors.	Wildfire	Stillwater Co., Columbus	Medium/16	High
		Project 1.1.12 - Conduct workshops and educational programs focused on severe weather for public and school children.	Wildfire	Stillwater Co., Columbus	Medium/16	High
	Objective 1.2 - Increase the situational awareness and warning of imminent or occurring hazards.	Project 1.2.1 - Work with the local media and Yellowstone County to continue broadcasting weather warnings over the Emergency Alert System.	All Hazards	Stillwater Co., Columbus	High/18	High
		Project 1.2.6 - Continue to broadcast warning information through dispatch.	All Hazards	Stillwater Co., Columbus	High/18	Medium
		Project 1.2.7 - Host National Weather spotter training sessions throughout the county.	Severe Weather, Flooding	Stillwater Co., Columbus	Medium/14	Medium
		Project 1.2.9 - Continue pushing out information on Red Flag Warnings for broadcast over Emergency Alert Systems.	Wildfire	Stillwater Co., Columbus	High/18	High
	Objective 1.3 - Protect critical infrastructure and facilities to reduce future losses and ensure continued delivery of essential services.	Project 1.3.1 - Purchase and install generators at critical facilities and potential shelter locations.	All Hazards	Stillwater Co., Columbus	Medium/14	High
		Project 1.3.2 - Encourage utility companies to bury electric and communication lines in hazard areas.	Severe Weather, Wildfire	Stillwater Co., Columbus	Medium/16	High
		Project 1.3.3 - Maintain trees that could impact county or city property.	Severe Weather	Stillwater Co., Columbus	Medium/14	High

Table 5.5-2. Stillwater County 2015 Mitigation Strategy

Goal	Objective	Project	Hazard	Jurisdiction	Benefit-Cost Ranking/Score	Priority
Goal 1 - Reduce population and property losses through comprehensive mitigation programs.	Objective 1.4 - Mitigate the impact of hazards on future development through land use and building regulations.	Project 1.4.5 - Investigate developing a regulatory mechanism to ensure that subdivisions are built as approved and fire protection systems are initially and periodically certified.	Wildfire	Stillwater Co., Columbus	Medium/16	High
		Project 1.4.6 - Update the countywide and town growth policies to require stricter consideration of high hazard areas during subdivision reviews.	Wildfire, Flood, Landslide	Stillwater Co., Columbus	Medium/14	Medium
		Project 1.4.7 - Use conservation easements in high hazard areas such as flood prone areas to prevent future development.	Flooding	Stillwater Co.	Medium/14	Medium
		Project 1.4.8 - Develop WUI defensible space guidelines to update subdivision regulations.	Wildfire	Stillwater Co., Columbus	High/18	High
Goal 2 - Protect the public, firefighters, communities, and property from losses due to wildfire.	Objective 2.1 - Decrease the probability of structure ignitions in the wildland urban interface	Project 2.1.1 - Encourage state and federal agencies and landowners to conduct fuel reduction on their property in the WUI.	Wildfire	Stillwater Co., Columbus	High/18	High
		Project 2.1.3 - Encourage homeowner associations to review their covenants to incorporate fire resistant materials.	Wildfire	Stillwater Co., Columbus	High/18	High
		Project 2.1.4 - Continue to increase size of ingress/egress roads where possible to create fire breaks.	Wildfire	Stillwater Co., Columbus	High/18	High
		Project 2.1.5 - Promote the landowner fuel reduction cost-share programs available.	Wildfire	Stillwater Co.	High/18	High
		Project 2.1.6 - Support inter-agency collaboration on fuel management projects.	Wildfire	Stillwater Co.	High/18	High
	Objective 2.2 - Improve local understanding of the wildfire hazard.	Project 2.2.2 - Use the digital wildfire mapping for land management and project development.	Wildfire	Stillwater Co.	High/18	Medium
		Project 2.2.3 - Conduct individual home audits for residences in the wildland urban interface.	Wildfire	Stillwater Co.	High/18	High
		Project 2.2.5 - Keep digital WUI map up to date.	Wildfire	Stillwater Co.	Medium/14	High
Goal 3 - Utilize hazard-specific strategies to reduce future losses from particular hazards.	Objective 3.1 - Minimize impacts of hazardous material spills.	Project 3.1.1 - Continue to report hazardous material spills to MT DES.	Haz-Mat	Stillwater Co., Columbus	High/18	High
		Project 3.1.4 - Ensure local emergency responders have adequate training to respond to hazardous material events consistent with local capabilities.	Haz-Mat	Stillwater Co., Columbus	High/18	High

Table 5.5-2. Stillwater County 2015 Mitigation Strategy

Goal	Objective	Project	Hazard	Jurisdiction	Benefit-Cost Ranking/Score	Priority
Goal 3 - Utilize hazard-specific strategies to reduce future losses from particular hazards.	Objective 3.2 - Minimize physical and financial losses from flood.	Project 3.2.3 - Continue compliance with the National Flood Insurance Program and the Stillwater County Flood Ordinance.	Flooding	Stillwater Co., Columbus	Medium/16	High
		Project 3.2.4 - Consider joining the Community Rating System volunteer incentive program.	Flooding	Stillwater Co., Columbus	Medium/10	Low
		Project 3.2.5 - Upgrade bridges, culverts, and roads to allow sufficient passage of floodwaters.	Flooding	Stillwater Co., Columbus	Medium/16	Medium
		Project 3.2.7 - Continue to implement the storm water plan in Columbus.	Flooding	Town of Columbus	Medium/16	High
		Project 3.2.8 - Determine mitigation for wastewater lagoons in Columbus which are in mapped flood hazard area.	Flooding	Town of Columbus	Medium/14	Medium
		Project 3.2.9 - Encourage MDT to implement appropriate mitigation for Highway 78 in Columbus.	Flooding	Town of Columbus	High/18	Medium
		Project 3.2.10 - Replace rip-rap near railroad north of Reed Point to preserve integrity of bridge.	Flooding	Stillwater Co.	Medium/14	Medium
		Project 3.2.11 - Determine source and nature of West Rosebud Road washout.	Flooding	Stillwater Co.	Medium/16	Medium
		Project 3.2.13 - Encourage MDT to remove debris on Keyser Creek at I-90 to maintain integrity of culverts and bridge.	Flooding	Stillwater Co.	Medium/14	Medium
		Project 3.2.14 - Encourage MDT to implement mitigation where flood maps indicate overtopping of I-90 between Springtime and Twin Bridges, west of Columbus.	Flooding	Stillwater Co.	Medium/10	Medium
		Project 3.2.15 - Encourage MDT to construct new bridge at Ollie's Corner where there is a potential for a flood problem.	Flooding	Stillwater Co.	Medium/12	Medium

Table 5.5-2. Stillwater County 2015 Mitigation Strategy

Goal	Objective	Project	Hazard	Jurisdiction	Benefit-Cost Ranking/Score	Priority
Goal 3 - Utilize hazard-specific strategies to reduce future losses from particular hazards	Objective 3.3 - Reduce and minimize the impacts of human diseases.	Project 3.3.2 - Control mosquito populations in wet areas.	Communicable Disease	Stillwater Co., Columbus	Medium/12	Medium
	Objective 3.4 - Reduce the impacts to the agricultural community from drought.	Project 3.4.1 - Develop and distribute range and agriculture management tools for local producers using weather and soil monitoring, planning, and education.	Drought	Stillwater Co., Columbus	Medium/16	Medium
	Objective 3.5 - Minimize structural losses from severe weather.	Project 3.5.1 - Implement the tree maintenance ordinance and address problem trees.	Severe Weather	Town of Columbus	High/18	High
		Project 3.5.2 - Perform simple mitigation activities such as filming windows and securing equipment.	Severe Weather	Stillwater Co., Columbus	Medium/16	Medium
	Objective 3.6 - Minimize structural losses from landslide.	Project 3.6.1 - Conduct a study of landslide prone areas.	Landslide	Stillwater Co.	Medium/12	High
		Project 3.6.2 - Implement preservation and stabilization measures at slide-prone areas.	Landslide	Stillwater Co.	Low/8	High
	Objective 3.7 - Minimize losses from terrorism, civil unrest, and violence.	Project 3.7.1 - Continue to be notified when large events come through the County.	Terrorism, Civil Unrest, Violence	Stillwater Co., Columbus	Medium/16	High
		Project 3.7.2 - Continue to conduct lone shooter exercises.	Terrorism, Civil Unrest, Violence	Stillwater Co., Columbus	Medium/16	High

SHADING: BLUE = New Objectives or Projects; YELLOW = Reworded Objective or Project Retained from 2010 Mitigation Strategy

Table 5.5-3. Stillwater County 2015 Mitigation Strategy – Implementation Details

Project	Jurisdiction	Responsible Agency / Department	Progress Made	Planned Activities	Schedule	Potential Funding Source
Project 1.1.1.1 - Conduct workshops and distribute information on wildfire hazard reduction and seasonal fire danger to rural property owners.	Stillwater Co., Columbus	SC DES, SC Fire Warden, Fire Chiefs/Depts.	Met with homeowner associations. Distributed info at fair and community events.	Continue same.	Ongoing	County Resources, USFS, BLM, DNRC
Project 1.1.1.3 - Distribute winter weather information in welcome packets to new residents.	Stillwater Co., Columbus	SC DES, NWS, MDT, Chamber of Commerce	Have distributed this info at health fairs every August	Continue same.	Ongoing	County Resources, MT DES, MDT
Project 1.1.1.7 - Target potentially affected citizens with information about the dam failure risk in their area and include information on exercises.	Stillwater Co., Columbus	SC DES, Utilities	Nothing so far.	During next exercise notify people downstream that they'll be affected.	Short-term	County Resources, Utility
Project 1.1.1.8 - Distribute information about building in the floodplain.	Stillwater Co., Columbus	SC DES, SC Floodplain Administrator	Have FEMA brochures available at Environmental Health office.	Continue same.	Ongoing	FEMA, DNRC
Project 1.1.1.9 - Promote immunizations and disseminate information on other public health topics.	Stillwater Co., Columbus	SC DES, SC Public Health Director & Nurse	Have info available at Public Health office.	Continue same.	Ongoing	DPHHS
Project 1.1.1.10 - Partner with surrounding counties and present workshops and presentations focused on defensible space and FireWise principles targeting county planning staff, county planning boards, architects, engineers, and realtors.	Stillwater Co., Columbus	SC DES, SC Fire Warden, Fire Chiefs/Depts.	Have had workshops but not targeting this group. Local audience not large enough to support.	Partner with surrounding areas and create regional workshop.	Short-term	County Resources, DNRC
Project 1.1.1.12 - Conduct workshops and educational programs focused on severe weather for public and school children.	Stillwater Co., Columbus	SC DES, NWS, MT DES	Every year during fire prevention week in Oct. visit every school and talk about wildfire and severe weather.	Continue same.	Ongoing	County Resources, DNRC, NWS
Project 1.2.1 - Work with the local media and Yellowstone County to continue broadcasting weather warnings over the Emergency Alert System.	Stillwater Co., Columbus	SC DES, NWS	Have done this when needed.	Continue same.	Ongoing	County Resources
Project 1.2.6 - Continue to broadcast warning information through dispatch.	Stillwater Co., Columbus	SC DES, NWS, SC Dispatch Supervisor	Reverse 911 system handles this.	Continue and upgrade as needed.	Ongoing	County Resources
Project 1.2.7 - Host National Weather spotter training sessions throughout the county.	Stillwater Co., Columbus	SC DES, NWS	Had training system during fall 2014.	Plan to have training once a year.	Ongoing	County Resources



Table 5.5-3. Stillwater County 2015 Mitigation Strategy – Implementation Details

Project	Jurisdiction	Responsible Agency / Department	Progress Made	Planned Activities	Schedule	Potential Funding Source
Project 1.2.9 - Continue pushing out information on Red Flag Warnings for broadcast over Emergency Alert Systems.	Stillwater Co., Columbus	SC DES, NWS	New project for 2015.	Coordinate with NWS and dispatch when conditions warrant.	Short-term	County Resources
Project 1.3.1 - Purchase and install generators at critical facilities and potential shelter locations.	Stillwater Co., Columbus	SC DES, ARC Coordinator	Applied for grants for County Pavilion, and Town Hall. Funding denied.	Will apply again for generators for these and other critical facilities.	Long-term	FEMA
Project 1.3.2 - Encourage utility companies to bury electric and communication lines in hazard areas.	Stillwater Co., Columbus	SC DES, SC Fire Warden	Utilities have billboards and media spots on this topic.	County will continue to encourage.	Ongoing	County Resources
Project 1.3.3 - Maintain trees that could impact county or city property.	Stillwater Co., Columbus	SC Road & Bridge, Columbus Public Works	Tree maintenance has taken place as needed or after event.	Continue same with emphasis on proactive approach.	Ongoing	County and Local Resources
Project 1.4.5 - Investigate developing a regulatory mechanism to ensure that subdivisions are built as approved and fire protection systems are initially and periodically certified.	Stillwater Co., Columbus	SC Attorney, SC Fire Warden, Fire Chiefs/Depts., SC Commissioners, SC Planner	Gets talked about but nothing has happened because County doesn't have enforcement or staff	Consult with county attorney, revise subdivision regulations to include defensible space guidelines and requirements.	Mid-term	County Resources
Project 1.4.6 - Update the countywide and town growth policies to require stricter consideration of high hazard areas during subdivision reviews.	Stillwater Co., Columbus	SC Commissioners, SC Planner, Columbus TC	No progress to report.	Use data in PDM Plan to create stricter criteria for development in hazard-prone areas.	Mid-term	County and Local Resources
Project 1.4.7 - Use conservation easements in high hazard areas such as flood prone areas to prevent future development.	Stillwater Co.	SC Commissioners, SC Planner, Columbus TC, Conservation Groups	No progress to report.	Identify flood-prone areas where conservation easements would be feasible. Coordinate with land conservation organizations.	Long-term	County Resources
Project 1.4.8 - Develop WUI defensible space guidelines to update subdivision regulations.	Stillwater Co., Columbus	SC Fire Warden, Fire Chiefs/Depts	New project for 2015.	Research what other counties are using. Amend for SC. Create new appendix with guidelines in subdivision regs.	Short-term	County Resources, DNRC

Table 5.5-3. Stillwater County 2015 Mitigation Strategy – Implementation Details

Project	Jurisdiction	Responsible Agency / Department	Progress Made	Planned Activities	Schedule	Potential Funding Source
Project 2.1.1 - Encourage state and federal agencies and landowners to conduct fuel reduction on their property in the WUI.	Stillwater Co., Columbus	SC Fire Warden, Fire Chiefs/Depts., Subdivision HOAs, USFS, BLM, DNRC	Fire dept. has been doing this for 7 years.	Continue to get grant money from RC&D and hire contractors to do projects. High priority fuels reduction projects for USFS Beartooth Ranger District includes all areas within USFS WUI layer for Beartooth Front. Primary goal is to reduce impact of large wildfires moving off USFS lands onto private land.	Ongoing	USFS, BLM, DNRC, FEMA
Project 2.1.3 - Encourage homeowner associations to review their covenants to incorporate fire resistant materials.	Stillwater Co., Columbus	SC Fire Warden, Fire Chiefs/Depts	New project for 2015.	Make presentation at HOA meetings. Provide updated language for covenants.	Short-term	County Resources
Project 2.1.4 - Continue to increase size of ingress/egress roads where possible to create fire breaks.	Stillwater Co., Columbus	SC Fire Warden, Fire Chiefs/Depts	New project for 2015.	Identify subdivisions where fuel breaks are needed. Present to HOA for support. Implement as appropriate.	Ongoing	County Resources, HOA
Project 2.1.5 - Promote the landowner fuel reduction cost-share programs available.	Stillwater Co.	SC Fire Warden, Fire Chiefs/Depts	New project for 2015.	Provide outreach at HOA meetings and other public events to increase awareness on programs available.	Ongoing	County Resources
Project 2.1.6 - Support inter-agency collaboration on fuel management projects.	Stillwater Co.	SC Fire Warden, Fire Chiefs/Depts	New project for 2015.	Attend inter-agency meetings and promote fuel reduction projects in/near WUI.	Ongoing	County Resources, USFS, BLM, DNRC
Project 2.2.2 - Use the digital wildfire mapping for land management and project development.	Stillwater Co.	SC GIS, SC Fire Warden, Fire Chiefs/Depts., USFS, BLM, DNRC	Fire Depts. use digital WUI map when determining need for fuel mitigation projects.	Continue same. Expand to inter-agency coordination.	Ongoing	USFS, BLM, DNRC, FEMA
Project 2.2.3 - Conduct individual home audits for residences in the wildland urban interface.	Stillwater Co.	SC Fire Warden, Fire Chiefs/Depts., Subdivision HOAs, USFS, BLM, DNRC	Have approached homeowners in high fuel areas when funding allows. Have completed over 200 assessments in past 5 years	Continue same as funding allows.	Ongoing	USFS, BLM, DNRC, FEMA
Project 2.2.5 - Keep digital WUI map up to date.	Stillwater Co.	SC DES	New project for 2015.	As subdivisions are approved, update digital WUI map.	Ongoing	County Resources
Project 3.1.1 - Continue to report hazardous material spills to MT DES.	Stillwater Co., Columbus	SC DES, Fire Chiefs/Depts., BNSF	Report as needed.	Continue same.	Ongoing	County Resources

Table 5.5-3. Stillwater County 2015 Mitigation Strategy – Implementation Details

Project	Jurisdiction	Responsible Agency / Department	Progress Made	Planned Activities	Schedule	Potential Funding Source
Project 3.1.4 - Ensure local emergency responders have adequate training to respond to hazardous material events consistent with local capabilities.	Stillwater Co., Columbus	SC DES, LEPC	New project for 2015.	Identify training opportunities and personnel who should attend. Research funding for training.	Ongoing	County Resources, Grants
Project 3.2.3 - Continue compliance with the National Flood Insurance Program and the Stillwater County Flood Ordinance.	Stillwater Co., Columbus	SC Floodplain Administrator	Outreach to homeowners in flood prone areas on benefits of NFIP.	Continue same.	Ongoing	County Resources
Project 3.2.4 - Consider joining the Community Rating System volunteer incentive program.	Stillwater Co., Columbus	SC Floodplain Administrator	Reviewed requirements to participate in CRS.	Bring up to Commissioners and LEPC and see if there is support for CRS participation.	Long-term	County Resources
Project 3.2.5 - Upgrade bridges, culverts, and roads to allow sufficient passage of floodwaters.	Stillwater Co., Columbus	SC Road Superintendent, Columbus Public Works, SC DES	Over 30 culverts upgraded after 2011 flood.	Continue same.	Ongoing	FEMA
Project 3.2.7 - Continue to implement storm water plan in Columbus.	Town of Columbus	Columbus Public Works Dept.	Storm drains installed from Diamond St. to 4 th St. on 4 th Ave. and north on Pratten, 5 th St. and 4 th St.	Install storm drains from Pike Ave. to 3rd Ave. N. on N. 2nd St. and from 1st Ave. N. to 3rd Ave. N. on Allen St., Diamond St, Pratten St., 5th St. and 4th St.	Ongoing	Local Resources, CDBG
Project 3.2.8 - Determine mitigation for waste-water lagoons in Columbus which are in mapped flood hazard area.	Town of Columbus	Columbus Public Works Dept.	New project for 2015.	Research grants to cover costs for engineering. Apply for grant. If funded, hire engineer to investigate and recommend action.	Mid-term	FEMA, CDBG, Local Resources
Project 3.2.9 – Encourage MDT to determine appropriate mitigation for Highway 78 in Columbus.	Town of Columbus	Columbus Public Works Dept.	New project for 2015.	Initiate discussions with MDT on appropriate action to alleviate flooding.	Mid-term	FEMA, MDT
Project 3.2.10 - Replace rip-rap near railroad north of Reed Point to preserve integrity of bridge.	Stillwater Co.	SC Commissioners, SC Road & Bridge	New project for 2015.	Coordinate with BNSF and implement project.	Mid-term	FEMA, BNSF, County Resources
Project 3.2.11- Determine source and nature of West Rosebud Road washout.	Stillwater Co.	SC Floodplain Administrator	New project for 2015.	Request DNRC to evaluate problem. Determine further activities needed.	Mid-term	FEMA, County Resources
Project 3.2.13 - Encourage MDT to remove debris on Keyser Creek at I-90 to maintain integrity of culverts and bridge.	Stillwater Co.	SC Commissioners, SC Road & Bridge	New project for 2015.	Meet with MDT to discuss feasibility. Determine further activities needed.	Mid-term	FEMA, MDT

Table 5.5-3. Stillwater County 2015 Mitigation Strategy – Implementation Details

Project	Jurisdiction	Responsible Agency / Department	Progress Made	Planned Activities	Schedule	Potential Funding Source
Project 3.2.14 - Encourage MDT to implement mitigation where flood maps indicate overtopping of I-90 between Springtime and Twin Bridges, west of Columbus.	Stillwater Co.	SC Commissioners, SC Road & Bridge	New project for 2015.	Meet with MDT to discuss feasibility. Determine further activities needed.	Mid-term	FEMA, MDT
Project 3.2.15 - Encourage MDT to construct new bridge at Ollie's Corner where there is a potential for a flood problem.	Stillwater Co.	SC Commissioners, SC Road & Bridge	New project for 2015.	Meet with MDT to discuss feasibility. Determine further activities needed.	Mid-term	FEMA, MDT
Project 3.3.2 - Control mosquito populations in wet areas.	Town of Columbus	SC Public Health, SC Sanitarian, Columbus TC	Columbus hires company to spray different areas during wet months.	Continue same.	Ongoing	Local Resources
Project 3.4.1 - Develop and distribute range and agriculture management tools for local producers using weather and soil monitoring, planning, and education.	Stillwater Co., Columbus	MSU Extension	MSU Extension does this.	Continue same.	Ongoing	County Resources
Project 3.5.1 - Implement the tree maintenance ordinance and address problem trees.	Town of Columbus	Columbus Public Works Dept.	New project for 2015.	Recruit volunteers for tree board. Identify problem trees. Conduct maintenance as needed.	Short-term	Local Resources
Project 3.5.2 - Perform simple mitigation activities such as filming windows and securing equipment.	Stillwater Co., Columbus	SC DES, Facility Managers	Stabilized computer equipment in some county offices.	Continue same.	Ongoing	FEMA
Project 3.6.1 - Conduct a study of landslide prone areas.	Stillwater Co.	SC Road & Bridge	New project for 2015.	Hire engineer to investigate and recommend action.	Short-term	County Resources
Project 3.6.2 - Implement preservation and stabilization measures at slide-prone areas.	Stillwater Co.	SC Road & Bridge	New project for 2015.	Determine ownership of slide-prone areas and legal authority.	Long-term	FEMA, County Resources, Landowners
Project 3.7.1 - Continue to be notified when large events come through the County.	Stillwater Co., Columbus	SC DES, SC law enforcement	New project for 2015.	Keep abreast of prospective events through media and other sources.	Ongoing	County Resources
Project 3.7.2 - Continue to conduct lone shooter exercises.	Stillwater Co., Columbus	SC DES, SC law enforcement	New project for 2015.	Continue to conduct lone shooter training in public schools.	Ongoing	County Resources, Dept. Homeland Security
Notes: ARC = American Red Cross; BLM = Bureau of Land Management; BNSF = Burlington Northern-Sana Fe Railroad; CDBG = Community Development Block Grant; DES = Disaster and Emergency Services; DNRC = Montana Department of Natural Resources and Conservation; DPHHS = Department of Public Health and Human Services; FEMA = Federal Emergency Management Agency; GIS = Geographic Information System; HOA = Home Owner Association; LEPC = Local Emergency Planning Committee; MDT = Montana Dept. of Transportation; MT = Montana; NWS = National Weather Service; SC = Stillwater County; TC = Town Council; USFS = United States Forest Service.						

SECTION 6. PLAN MAINTENANCE PROCEDURES

The plan maintenance section details the formal process that will ensure that the Stillwater County PDM Plan 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 the County will monitor the progress of mitigation activities and be incorporated into existing planning mechanisms. The final section describes how the County will integrate public participation throughout the plan maintenance process.

6.1 Monitoring, Evaluating and Updating the Plan

The evaluation of the mitigation plan is an assessment of whether the planning process and actions have been effective, if the Plan goals are being reached, and whether changes are needed.

6.1.1 2010 PDM Plan

The 2010 PDM Plan was neither monitored nor evaluated since it was developed and adopted, with a few exceptions. Before the exercise at the Mystic Lake Dam, the dam failure section of the PDM Plan was reviewed to see if there was any additional information to consider. During the five year period since the original Plan was developed, a couple of things were brought up to the LEPC and notes were made on what needed to be updated. Mitigation projects were completed during this period as shown in *Section 5.1*; however, the PDM Plan was not evaluated for relevancy.

6.1.2 2015 PDM Plan

The PDM Plan should be reviewed at meetings of the LEPC. A different hazard profile should be reviewed quarterly by the LEPC. The plan review should consider any new hazards and vulnerabilities as well as document completed mitigation projects, identify new mitigation projects and evaluate mitigation priorities. 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 PDM Plan review is on the agenda at the LEPC meetings so that applicability of the plan can be evaluated. The DES Coordinator should prepare a status report summarizing the outcome of the plan review and the minutes should be made available to interested stakeholders and kept in a permanent file designated for the next (2020) PDM Plan update.

The PDM Plan 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.

Three years after adoption of the PDM Plan, the Stillwater County DES Coordinator may decide to apply for a planning grant through FEMA to start the 2020 PDM Plan update. Upon receipt of funding, the County will solicit bids in accordance with applicable contracting procedures and hire a contractor to assist with the project. The proposed schedule for completion of the plan update is one year from award of a contract, to coincide with the five-year adoption date of the 2015 PDM Plan Update.

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 Board of County Commissioners and Columbus Town 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 is the responsibility of the LEPC, an organization comprised of individuals from County and Town departments, emergency response entities, and local business who meet on a regular basis.

6.2.1 2010 PDM Plan

Since development of the 2010 PDM Plan, several mitigation projects were completed in Stillwater County while a number of other projects are on-going and will continue through the next planning period. Completed projects are identified in *Section 5.1*.

The Stillwater County DES Coordinator has monitored completion of most of these activities; however, the 2010 PDM Plan did not outline a specific process to track the initiation, status, and completion of mitigation activities. Each department monitors completion of mitigation projects under their purview; the City-County Fire Department monitors fuel reduction projects; County Road & Bridge Department monitors culvert projects; and Town of Columbus Public Works monitors storm water projects. In addition to completed projects from the 2010 PDM Plan, the Stillwater County Emergency Operations Plan was updated in 2011 and hazard-specific annexes were reviewed and revised.

6.2.2 2015 PDM Plan

The LEPC will review the mitigation goals, objectives, and activities to ensure progress is being made. They will evaluate the feasibility of the mitigation projects, monitor resources, budgets, and schedules, and document project completion. This group will provide a venue for reporting and accountability.

Minutes should be prepared from these meetings and should be distributed to interested stakeholders as well as kept in a permanent file for the next PDM Plan update (2020). Agencies and organizations “assigned” responsibility for various aspects of the mitigation strategy will have the opportunity to coordinate with the LEPC on challenges, success and opportunities.

The information that the LEPC shall be expected to document, as needed and appropriate, include:

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

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 PDM Plan 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.

Individual projects will be monitored by the department implementing the project or the grant. Generally, HMGP and PDMC projects will be monitored by the County DES Coordinator and any National Fire Plan projects or Community Assessment Agreements will be monitored by the City-County Fire Department, U.S. Forest Service and/or DNRC. Each organization will track projects through a central database and issue quarterly reports to federal agencies.

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 PDM Plan 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.

A summary of how the PDM Plan 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 northwestern Montana to support hazard mitigation activities.

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 PDM Plan.
	Emergency Action Plan, Mystic Lake Dam	Dam failure mitigation projects should be integrated in EAPs when these documents are revised.
Growth Policies	Stillwater County Growth Policy, 2007	Integration of mitigation strategies will occur when growth policies are revised.
	Town of Columbus Growth Policy, 2012	
Neighborhood Plans	Neighborhood Addendum to County Growth Policy, 2010	Integration of mitigation strategies will occur when neighborhood addendum is revised.
Wildfire Mitigation	Stillwater County Community Wildfire Protection Plan, 2006	Wildfire mitigation projects will be incorporated when plans are revised.
Severe Weather	Stillwater County Snow Removal Plan, 2014-15	Severe weather mitigation projects will be incorporated when plan is revised.
Economic Development	Stillwater County Overall Economic Development Plan, 2015	Integration of mitigation strategies will occur, as appropriate, when plan is revised.
Codes, Regulations & Ordinances		
Zoning	Town of Columbus Zoning Ordinance	Mitigation projects will be incorporated into revisions of zoning ordinances.
Ordinances	Town of Columbus Tree Ordinance	Mitigation projects will be incorporated into ordinance revisions.
	Town of Columbus Storm Drain Master Plan Ordinance	
Subdivisions	Stillwater County Subdivision Regulations	Mitigation projects will be incorporated into revisions of subdivision regulations.
	Town of Columbus Subdivision Regulations	
Floodplain	Stillwater County Floodplain and Floodway Management Regulations	Flood mitigation projects will be incorporated into revisions of floodplain regulations.
	Town of Columbus Floodplain Regulations	

Stillwater County and the Town of Columbus use Growth Policies 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 PDM Plan 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 PDM Plan 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. The job descriptions of County and City Planners will be augmented to include involvement in the LEPC. Participation in these groups 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 County GIS Coordinator will include responsibilities for management and update of the spatial data compiled for the hazard analysis including coordinates of critical facilities and digital floodplain, inundation, and wildfire layers so this data can be integrated into other planning efforts. 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, ensure mitigation projects are implemented, and updating the PDM Plan. The DES Coordinator will also be responsible for maintaining permanent master file for the PDM 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 will provide an opportunity for the Stillwater County DES Coordinator to report back on the progress made on the integration of mitigation planning elements into County planning documents and procedures.

6.4 Continued Public Involvement

Stillwater County is dedicated to involving the public directly in review and updates of the PDM Plan. The public will have many opportunities to provide feedback about the plan. Hard copies of the plan will be kept at appropriate County offices. An electronic copy of the plan will be available on the County website. The existence and location of plan hard copies will be publicized on the County website and Facebook page. *Section 2.0* includes the address and the phone number of the Stillwater County DES Coordinator 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 PDM Plan 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 the newspapers, radio and Internet.

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