

2016 Update to Pre-Disaster Mitigation Plan



City and County of Butte-Silver Bow, Montana and Town of Walkerville



September 2016



**2016 UPDATE TO
PRE-DISASTER MITIGATION PLAN**

FOR

**CITY AND COUNTY OF BUTTE-SILVER BOW, MONTANA
AND
TOWN OF WALKERVILLE**

Prepared for:

**Butte-Silver Bow Office of Emergency Management
3619 Wynne
Butte, Montana 59701**

Prepared by:

**Tetra Tech Inc.
303 Irene Street
Helena, Montana 59601
(406) 443-5210**

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LIST OF ACRONYMS

BLM	Bureau of Land Management
BNSF	Burlington Northern-Santa Fe Railroad
BSB	Butte-Silver Bow
CDBG	Community Development Block Grant
CDP	Census Designated Place
CEDS	Comprehensive Economic Development Strategy
CEIC	Census and Economic Information Center
CPRI	Calculated Priority Risk Index
CRP	Conservation Reserve Program
CRS	Community Rating System
CWPP	Community Wildfire Protection Plan
DES	Disaster and Emergency Services
DMA	Department of Military Affairs
DMA	Disaster Mitigation Act
DNRC	MT Department of Natural Resources and Conservation
DOI	U.S. Department of Interior
DPHHS	MT Department of Health and Human Services
EAP	Emergency Action Plan
EMS	Emergency Medical Services
EMPG	Emergency Management Performance Grant
EOC	Emergency Operations Center
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right to Know Act
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FMA	Flood Mitigation Assistance
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
MBMG	Montana Bureau of Mines and Geology
MDOR	Montana Department of Revenue
MDT	Montana Department of Transportation
NCDC	National Climatic Data Center
NFIP	National Flood Insurance Program
NFP	National Fire Plan
NFPA	National Fire Protection Association
NID	National Inventory of Dams
NOAA	National Oceanic and Atmospheric Administration
NRIS	Natural Resource Information System



LIST OF ACRONYMS

NTSB	National Transportation Safety Board
NWS	National Weather Service
OEM	Office of Emergency Management
PDM	Pre-Disaster Mitigation
PDMC	Pre-Disaster Mitigation Competitive (grants program)
RC&D	Resource Conservation and Development
RFA	Rural Fire Assistance
SHELDUS	Spatial Hazard Events and Losses Database for the United States
STD	Sexually Transmitted Disease
TRI	Toxic Release Inventory
UBC	Uniform Building Code
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), the City and County of Butte-Silver Bow, and the Town of Walkerville, 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.

Butte-Silver Bow 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 Butte-Silver Bow 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 Butte-Silver Bow 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 2016 updated PDM Plan supersedes the 2010 PDM Plan.

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

1.2 Authority

The Butte-Silver Bow 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 Butte-Silver Bow County Chief Executive and Council of Commissioners have adopted this PDM Plan. Also adopting the Plan is the incorporated community of Walkerville. 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 Town Council meetings, which were open to the public and advertised through the typical process the jurisdictions use for publicizing meetings.

Butte-Silver Bow County will be responsible for submitting the adopted PDM Plan to FEMA for review. Upon acceptance by FEMA, Butte-Silver Bow County and the incorporated community of

Walkerville 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 Butte-Silver Bow County PDM Plan. The Butte-Silver Bow County Office of Emergency Management (OEM) 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 Steering Committee, 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 Butte-Silver Bow 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 Butte-Silver Bow (BSB) County PDM Plan is the result of a collaborative effort between City and County of Butte-Silver Bow, the incorporated community of Walkerville, 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 Butte-Silver Bow County, local departments, state and federal agencies that support activities in the County, neighboring communities and local partners.

2.1 PDM Steering Committee

The Butte-Silver Bow County OEM director requested the LEPC serve as the PDM Steering Committee 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 Steering Committee

Organization / Position	Type of Organization
BSB County Office of Emergency Management	City-County Government
BSB County Sheriff	City-County Government
BSB County GIS	City-County Government
BSB County 9-1-1	City-County Government
BSB County Planning Department	City-County Government
BSB County Public Health Department	City-County Government
BSB County Information Officer	City-County Government
BSB County Risk Management	City-County Government
BSB County Fire Department & Volunteer Fire Departments	City-County Government
BSB County Environmental Health Department	City-County Government
BSB County School District	City-County Government
BSB County Facilities Manager	City-County Government
Town of Walkerville Fire Department	Town Government
Montana Highway Patrol	State Agency
Montana Bureau of Mines and Geology	State Agency
Montana Tech of the University of Montana	State University
NorthWestern Energy	Private Utility
St. James Healthcare	Private Hospital
REC Silicon	Private Business
American Red Cross	Non-Profit Organization
Ham Radio Club	Non-Profit Organization
U.S. Forest Service – Butte Ranger District	Federal Land Management Agency
U.S. Bureau of Land Management	Federal Land Management Agency

Responsibilities of the Steering Committee 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 Steering Committee will assist the BSB County OEM in updating the Plan in the future.

Meetings and conference calls were held with the Steering Committee while the plan was being drafted. In advance of each meeting or conference call, an agenda and/or materials to be discussed (i.e. hazard maps, hazard ranking matrices, example mitigation strategies, etc.) were sent to meeting participants. The Montana Bureau of Mines and Geology (MBMG) attended one Steering Committee meeting to discuss the earthquake vulnerability and the U.S. Forest Service attended a meeting to discuss the wildfire risk in the area. Meeting/conference call minutes are presented in **Appendix B**.

During the first public meeting, the Steering Committee and other meeting participants reviewed and analyzed each section of the 2010 Hazard Mitigation Plan, as described in **Table 2.1-2**.

Table 2.1-2. Review and Analysis of 2010 Hazard Mitigation 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 Steering Committee meetings. Reviewed and updated hazards, critical facilities and vulnerable populations. Updated sections with recent hazard data.
Section 4 - Mitigation Strategy	Reviewed by Steering Committee during conference calls and public meetings. New projects developed, existing projects re-worded and/or deleted, completed projects documented. Capability assessment updated.
Section 5 - Plan Maintenance Procedures	Reviewed and analyzed existing section through discussion during Steering Committee conference calls. Determined that plan maintenance procedures outlined in previous plan were implemented but not documented.

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 Chief Executive, Council of Commissioners, the Office of Emergency Management, Community Development (Planning), Sheriff’s Department, Fire Departments, Public Works Department, Health Department, Ambulance, 9-1-1 Manager, Building Department, Environmental Health, GIS, Safety and Risk Management, Extension Office, Airport, and Metro Sewer Division. These entities participated in the planning process by either providing data, attending public meetings, participating on the PDM Steering Committee, and/or reviewing the draft PDM Plan.

Stakeholders from the Town of Walkerville included: the Mayor and Fire Department. These entities participated in the planning process by either providing data, attending public meetings, participating on the PDM Steering Committee, and/or reviewing the draft PDM Plan.

Stakeholders from federal agencies included representatives from: the National Weather Service (NWS), U.S. Forest Service, and U.S. 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 Natural Resources and Conservation (DNRC), Montana Highway Patrol, MBMG, Montana Tech, Montana Department of Health and Human Services (DPHHS) the District Representative from the Montana DES, and the 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 (non-profits, utilities, businesses) included: American Red Cross, Chamber of Commerce, Mainstreet Uptown Butte, Montana Standard newspaper, KXLF-TV, Arcadia Montana, St. James Hospital, Northwestern Energy, Amateur Radio, and REC Silicon. Some of these entities provided information for plan development, attended the public meetings, participated on the PDM Steering Committee, and/or reviewed the draft PDM Plan update.

Planning partners from adjoining jurisdictions included: the Jefferson, Madison, and Beaverhead County DES Coordinators. These entities did not offer input on the Butte-Silver Bow 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, Basin Creek Dams
- Emergency Action Plan, Yankee Doodle Tailings Impoundment, December 2015

EMERGENCY OPERATIONS

- BSB Comprehensive Emergency Management Plan, July, 2011

GROWTH POLICIES, ORDINANCES, REGULATIONS

- BSB City-County Growth Policy, 2008 Update
- Central Butte Area Neighborhood Plan Amendment to the BSB Growth Policy, 2010
- Greeley Area Neighborhood Plan Amendment to the BSB Growth Policy, 2010
- BSB City-County Subdivision Regulations, 2009
- City-County Floodplain Management Ordinance
- City-County Zoning Regulations

HAZARD MITIGATION

- BSB County and Town of Walkerville Hazard Mitigation Plan, 2010
- BSB County Community Wildfire Protection Plan, 2005

OTHER

- BSB County Urban Forest Management Plan, March 2013
- BSB Comprehensive Historic Preservation Plan, draft, 2013
- Southwestern Montana Comprehensive Economic Development Plan, 2012-2017
- BSB Transportation Plan Update, 2005
- BSB Uptown Urban Renewal Plan, 2014

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 Butte-Silver Bow County. The project website can be viewed at: www.countypdm.com/ (password: Butte). The website remained active during the course of the project through adoption of the plan.

The website contained a Home page and pages for: Contacts, Steering Committee, 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 Steering Committee page contained maps for the Steering Committee 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 Butte-Silver Bow 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. The first public meeting was held to kick-off the project. At this meeting, the 2010 PDM plan was reviewed and hazard events over the past five years were discussed. The Steering Committee met several times over the course of the project; once to rank the hazards, and two other times via conference call to update the mitigation strategy. The second public meeting was held to review the draft risk assessment and to kick-off the public review period for the draft PDM Plan. Sign-in sheets, handouts, presentations, and meeting notes are contained in **Appendix B** and posted on the project website.

The first public meeting was held on November 5, 2015 at the new BSB Emergency Operations Center at the Butte Justice Center in Butte. The meeting was advertised in the November 4, 2015 edition of the Montana Standard newspaper. The Montana Standard published an article on the PDM Update project on November 2, 2015. The public meeting was advertised on social media (Facebook, Twitter). A meeting notice was sent via e-mail to all project stakeholders and the meeting was posted on the project website. Media documentation is presented in **Appendix B**.

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 33 individuals participated in the meeting including representatives from BSB County OEM, the City-County Health Department, City-County municipal and volunteer fire departments, City-County Risk Management, City-County Planning Director and Floodplain Administrator, City-County 9-1-1, City-County Superintendent of Schools, City-County Clerk and Recorder, City-County Public Information Officer, City-County GIS Dept., Town of Walkerville Volunteer Fire Dept., Montana Tech of the University of Montana, Montana Highway Patrol, U.S. Forest Service, Region 8 DMORT, American Red Cross, Butte Amateur Radio Club, Arcadia, St. James Healthcare, a local architect, Montana Standard newspaper, and nine members of the public.

A second public meeting to review the draft PDM Plan was held on July 13, 2016 at the BSB Emergency Operations Center. The public meeting was held during the first 45-day period the public was asked to review the draft PDM Plan. A notice of the meeting was sent via email to the project stakeholders, advertised in an article in the July 12, 2016 edition of the Montana Standard newspaper, advertised on the BSB County website and social media (Facebook, Twitter), and on the project website. Tetra Tech presented results of the PDM risk assessment at the meeting as well as the updated mitigation strategy. Twenty-one (21) individuals attended the public meeting including representatives from the BSB County OEM, City-County Health Department, Risk Management, Government Buildings, Fire Department, 9-1-1, Public Information Officer, three representatives from the Town of Walkerville (mayor, volunteer fire department, and a private citizen), Montana Tech of the University of Montana, the U.S. Forest Service, members of the Butte Amateur Radio Club, St. James Healthcare, 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 September 9, 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. A notice was placed on social media 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 BSB County Office of Emergency Management at 3619 Wynne, in Butte, Montana. 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 BSB County OEM office after a 45-day review period (June 20 – August 5, 2016). BSB County OEM Director reviewed the comments and in consultation with the Steering Committee submitted a consolidated list of comments to the contractor and a plan revision was completed.

Section 2: Planning Process

The final draft plan was again posted on the project website and stakeholders were notified of its availability via an e-mail message and social media. At this point a second opportunity was provided to the public to comment on the PDM Plan. The final draft plan was available for a second 45-day review period (August 15 – September 30, 2016).

Concurrent with the public review, the 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 FEMA, along with comments received from the second public review of the final draft, were addressed in a second plan revision. The final plan was provided to the BSB Chief Executive and Council of Commissioners and the Walkerville Town Council for adoption. After adoption, copies of the final plan were submitted to BSB County, Walkerville, Montana DES and FEMA.

Future comments on the PDM Plan should be addressed to:

Butte-Silver Bow County Office of Emergency Management
3619 Wynne, Butte, Montana 59701
(406) 497-6295



SECTION 3. COMMUNITY PROFILE

This section of the PDM Plan presents an overview of BSB County and the community of Walkerville, 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

The consolidated city-county of Butte-Silver Bow is located in southwest Montana as shown in **Figure 1** with a population of 34,680 (2014 U.S. Census estimate) and an area of 718 square miles. Butte-Silver Bow's jurisdiction includes the incorporated town of Walkerville, and the unincorporated communities of Butte, Centerville, Divide, Gregson/Fairmont Hot Springs, Melrose, Nissler, Ramsay, and Rocker. The city of Butte serves as the county seat.

The county covers approximately 459,746 acres, most of which is forested, with elevations ranging from 4,420 feet above sea level in the extreme eastern portion along the Jefferson River to over 10,000 feet at the top of the tallest peaks. The Continental Divide forms a significant portion of the county's eastern boundary at the north end. To the south and east, it bisects the county into two parts. The Big Hole River forms a portion of the south boundary of the county.

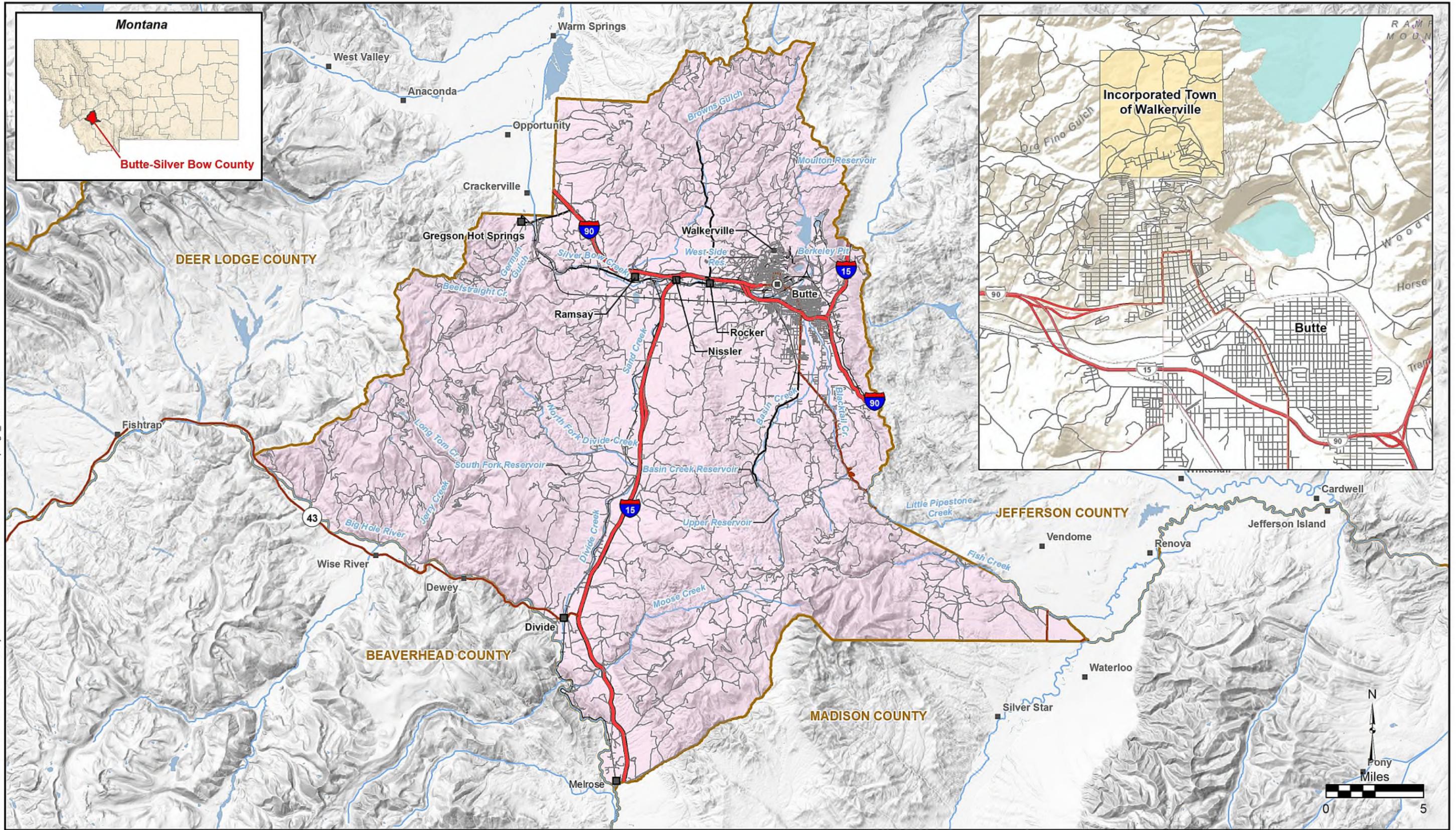
The Butte area is well known for its history of mining. Once called the "Richest Hill on Earth", Butte became a center for mining and industry during the late 1800's to early 1900's. The mining business continued at a fast pace until the early 1980's when copper prices dropped. Estimates are that about \$22 billion of metals have been mined from the Butte area. Uptown Butte is now part of a National Historic Landmark District with over 4,500 buildings. The industry and mining during the early to mid-1900's led to land and water contamination and the U.S. Environmental Protection Agency (EPA) is actively working in the county through its Superfund program.

Private land in BSB County accounts for 42.8 percent of the total. Other lands in BSB County are managed by federal and state agencies. The federal government manages approximately 51.0 percent of the total land in BSB County including portions of the Beaverhead-Deerlodge National Forest (189,205 acres) and BLM land (45,253 acres). The State of Montana manages a 6.2 percent of the acreage within BSB County. Lands managed by the Montana DNRC Trust Lands Management Division account for 44,933 acres, Montana Fish, Wildlife and Parks manage 310 acres. Local government owns 81 acres. **Figure 2** presents landownership and population density in BSB County. Population density in BSB County is 46.8 persons per square mile compared to the average 6.8 persons per square mile for the State of Montana (Census Quick Facts, 2015).

3.2 Climate

The climate of BSB County makes it prone to weather-related hazards. Winters are long and cold, January averaging at 18 °F, with 36 nights falling below 0 °F and 58 days failing to top freezing. Summers are short, with very warm days and chilly nights: July averages 63 °F. Annual precipitation is low and largely concentrated in the spring months: the wettest month since precipitation records began has been June 1913 with 8.86 inches, whilst no precipitation fell in September 1904.

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Legend

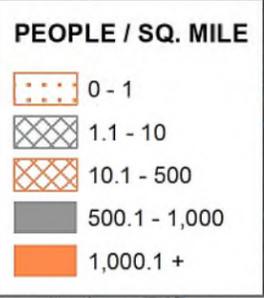
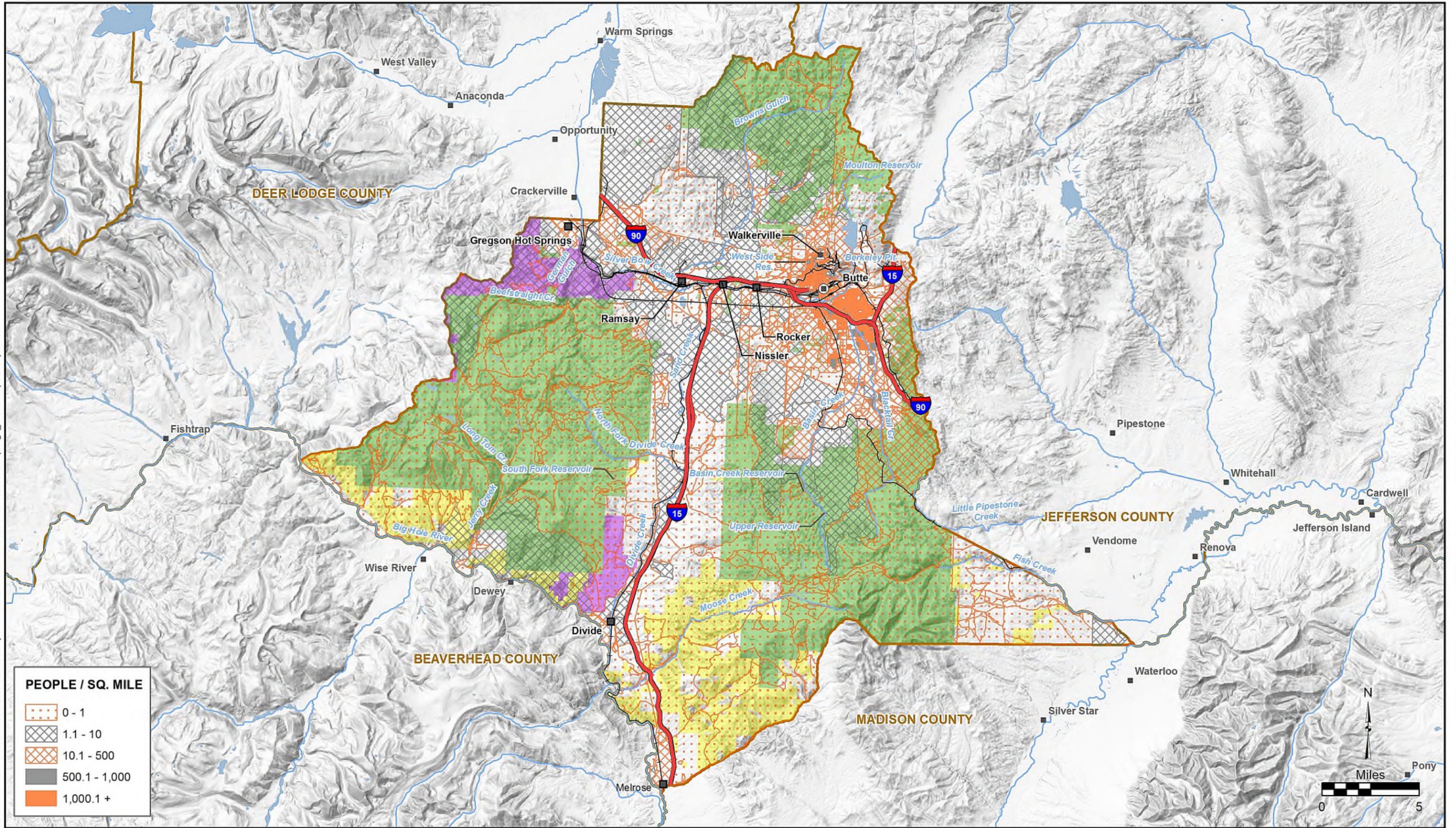
- ⊙ County Seat
- △ Incorporated Place
- Place Name
- Interstate
- Primary Route
- Secondary Route
- Other Route
- Railroad
- Lake/Reservoir
- River/Stream
- County



April 2016

Figure 1

Location Map
Butte-Silver Bow County
Pre-Disaster Mitigation Plan



Legend

- County Seat
- Railroad
- Lake/Reservoir
- Bureau of Land Management
- Incorporated Place
- Interstate
- River/Stream
- US Forest Service
- Place Name
- County
- Montana Fish, Wildlife, and Parks



The wettest calendar year has been 1909 with 20.55 inches and the two driest 1935 with 6.89 inches and 1895 with 6.98 inches. Snowfall is somewhat limited by dryness: the most in one month being 32.5 inches in October 1911 and the greatest depth on the ground 27 inches on December 28-29, 1996.

The coldest month has been January 1937 with a daily mean temperature of -5.5 °F, whilst the coldest complete winter was 1948/1949 with a three-month mean of 6.69 °F and the mildest 1925/1926 which averaged 29.21 °F. July 2007 has been the hottest month, with a mean maximum of 88.8 °F, although the hottest day, reaching 100 °F, occurred on July 22, 1931 and June 30, 2000.

In an average year, 232 days drop to or below freezing, and about 40 days report thunderstorms. Butte receives about 57 inches of snow and 13 inches of precipitation (liquid equivalent) in an average year. In contrast, the weather reporting station near Divide averages about 41 inches of snow each year and 12 inches of precipitation (liquid equivalent). **Table 3.2-1** presents climate statistics for Butte.

Table 3.2-1. Butte-Silver Bow County Climate Statistics - Butte

Category	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average High (°F)	32	35	44	52	61	70	81	80	68	55	40	29
Average low (°F)	7	9	19	26	34	41	46	44	36	27	16	5
Avg. Precipitation (Inches)	0.47	0.43	0.75	1.18	2.09	2.24	1.34	1.38	0.98	0.79	0.59	0.51
Average Snowfall (Inches)	8	8	11	7	4	0	0	0	1	4	9	10

Source: <http://www.usclimatedata.com/climate/butte/montana/united-states/usmt0336>

A climate change study by the University of Montana predicts warmer temperatures and associated drought over the course of the next century with annual temperatures projected to warm 3.6 to 7.2 degrees. Winters will be shorter and summers will be longer with spring snowmelt occurring four to six weeks earlier and summer drought periods lasting six to eight weeks longer.

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 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*.

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 BSB 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 BSB County Growth Policy (2008) and 2010 BSB Hazard Mitigation Plan are presented below.

3.3.1 Water and Wastewater Services

The Water Utility Division provides municipal and industrial water to Butte-Silver Bow. Water sources serving the county include the Big Hole River/South Fork Reservoir, Moulton Reservoirs, and Basin Creek Reservoir System. According to the BSB Growth Policy (2008), these surface water sources supplied 12,376 homes and businesses with 3.04 billion gallons of potable water. Water from each source can be diverted and utilized at any location within the community. The Big Hole Water Treatment Plant began operations in December of 1994 and has the capability to treat 16 million gallons of water per day. The Moulton Water Treatment Plan is located north of Walkerville and is a 2.5 million gallon per day water treatment facility.

The Basin Creek Reservoir is located south of Butte and has a storage capacity of 364 million gallons. Renovations to the Basin Creek Reservoir dam and spillway were completed in February, 2006. A water treatment plant is currently being completed to treat the surface water for turbidity. Silver Lake provides water for industrial uses under water services agreements.

Metro Sewer collects, treats, and disposes of wastewater in urban Butte. There are approximately one million lineal feet or 200 miles of sewer lines in the urban area, serving 12,598 households. Treatment occurs at the Metro Sewer Plant, located in the southwest corner of the urban area. The facility treats 3 to 3.5 million gallons daily and has the capacity to treat 8.5 million (BSB Growth Policy, 2008).

3.3.2 Utilities

NorthWestern Energy provides natural gas and electricity to approximately 13,800 residential customers and 2,300 commercial/industrial customers in Butte-Silver Bow. NorthWestern Energy has significant infrastructure within BSB County.

3.3.3 Transportation

BSB County is responsible for approximately 750 miles of roadway and six bridges. The county provides ongoing maintenance and remain, snow removal and street and storm drain cleaning. Interstates in BSB County include I-90 and I-15. Principal arterials include: Harrison Ave., Front St., Montana St. between La Salle Ave. and Granite St., Park St. between Montana St. and Utah Ave., Galena St. between Montana St. and Utah Ave., and Utah Ave. between Front St. and Granite St. Remaining streets are divided among secondary arterials, collectors, rural collectors and local roads.

The primary provider of public transit services is Butte-Silver Bow Transit, an agency within the Public Works Dept. The transit service operates seven buses on a fixed-route system within the Butte urban area including Walkerville.

3.3.4 Law Enforcement and Emergency Services

The BSB Law Enforcement Dept. provides BSB County with protection of lives and property, and works to provide a safe and secure environment for all citizens of the county. The Department is headquartered at 225 Alaska Street in Butte and employs 46 sworn officers. 31 of which are the department's patrol officers. BSB Law Enforcement Dept. responds to over 29,000 calls for service per year (BSB Growth Policy, 2008).

Enhanced 911 Services

Enhanced 911 or E-911 provides the communication mechanism for emergency services response in BSB. Emergency services encompass police, fire and medical crises. Enhanced 911 is the term used to describe an emergency phone system that provides an automatic address located for all wire line phones. In addition, BSB County also provides E-911 Phase Two communication, a system which enables calls from wireless (cell) phones to be plugged into a mapping system, providing latitudinal and longitudinal points that closely approximate the location of the called.

In 2007, BSB County added an Emergency Preparedness Notification System which allows notifying citizens of an emergency in cases where evacuation or other mitigation measures are required. In 2008, BSB County joined the Montana Interoperability Project which enables the county to upgrade its radio systems. Dispatch, master controller, mobile, and portable radios for police and fire services became digital, which enabled the integration of local radio systems into the state-wide network.

Fire Services

The mission of the Fire Department is to provide the highest level of fire protection through prevention, suppression, and education. The Fire Department provides personnel and equipment to: suppress and prevent fires, conduction building inspections and fire investigation, and deliver emergency medical services (EMS).

BSB County is served by two municipal fire stations (Mercury Street and Harrison Avenue) and nine volunteer departments (Big Butte, Centerville, Boulevard, Home-Atherton, Floral Park, Racetrack, Rocker, Terra Verde, and Little Basin Creek). These departments are served by 35 full time paid personnel and over 150 volunteer fire department personnel. The community of Divide is served by the Boulevard and Rocker Fire Departments, while the Rocker, Butte-Silver Bow and Opportunity (Deer Lodge County) Districts serve Fairmont Hot Springs. Ramsay is served by the Rocker, Boulevard and Butte-Silver Bow stations. Melrose, the Town of Walkerville and Wise River have their own fire services departments.

The BSB Fire Department receives 2,700 calls annually, of which 70 percent are EMS calls. The Fire Department does not provide any transport services. All ambulance services are provided by A1 Ambulance. Rescue and transport services are coordinated through the County's E-911 service. The BSB Fire Department provides emergency life support services county-wide and has two dedicated

rescue vehicles. In addition, all of the Department’s vehicles have life support capability (BSB Growth Policy, 2008).

Office of Emergency Management

The BSB Office of Emergency Management operate a local office in a new facility (completed in 2015) which also serves as the local Emergency Operations Center (EOC) in the event of an emergency. The EOC is a designated area established for facilitating the overall management of an emergency. The EOC provides a multi-agency coordination center where elected officials and senior agency representatives gather to: manage coordination, communications, data and information collection; design and disseminate public information; engage in strategic senior decision-making processes; and, provide the primary link to state and federal agencies. The OEM also manages the BSB Mobile Command Vehicle that is used to provide mobile organizational and communications functions during incidents.

The OEM provides the following services: plans, organizes, and manages the BSB Emergency Preparedness Program; evaluates, improves, and promotes comprehensive disaster planning efforts; organizes and facilitated effective operations of multi-jurisdiction, multi-discipline work groups and task forces; promotes interagency coordination; and develops and reviews polices, contracts, and interagency agreements. These efforts are designed to enhance the capacity of the local government to plan for, respond to, and mitigate the consequences of threats and disasters using an all-hazards framework. Overall, the OEM emphasized preparedness in addressing potential natural threats (earthquakes, wildfires, flooding).

3.4 Population Trends

According to the 2014 U.S. Census estimates, BSB County is the 8th most populous in Montana with a population of 34,680. This represents a 1.4 percent increase since the 2010 census. **Table 3.4-1** illustrates the change in population in BSB County compared to the United States and State of Montana.

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

Year	Butte-Silver Bow Co. Population	% change from previous census	State of Montana Population	% change from previous census	United States Population	% change from previous census
2010	34,200	-1.17%	989,415	9.67%	308,745,538	9.71%
2000	34,606	1.96%	902,190	12.91%	281,424,602	13.15%
1990	33,941	-10.90%	799,065	1.57%	248,709,873	9.79%
1980	38,092	-9.26%	786,690	13.29%	226,542,199	11.43%
1970	41,981	-9.63%	694,409	2.91%	203,302,031	13.37%

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

Table 3.4-2 presents population statistics for BSB County and the town of Walkerville.

Table 3.4-2. Butte-Silver Bow City-County and Walkerville 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
Butte-Silver Bow, balance	37,205	-59.21%	33,336	-10.40%	33,892	1.67%	33,525	-1.08%
Walkerville, town	887	-19.14%	605	-31.79%	714	18.02%	675	-5.46%

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



According to the BSB Growth Policy (2008), the city of Butte and Silver Bow County grew rapidly in the mid-1880s as people arrived in search of mining jobs and economic prosperity. By 1890, the population of Butte had reached 10,723 and peaked in 1920 with almost 42,000 people. County population reached 23,744 by 1890 and also peaked in 1920 at 60,313. Just as mining opportunities drew people to Butte, decline in the industry precipitated population decline. The years following 1920 were years of continuous decline. The county reached a low point in 1990 and then exhibited slight growth between 1990 and 2000 (1.95% or 665 people). The net population change between the county’s peak in 1920 and the 2000 census was a loss of 25,707 people.

The 2008 BSB Growth Policy reports that recent population trends indicate that BSB County experienced population growth between 1990 and 1998 at a rate of 3.8 percent. This growth occurred during a time when the total number of jobs was increasing due to a period of expansion. Population estimates for 2014 indicate BSB has experienced growth at a rate of 1.4 percent.

The median age of the population in BSB County is increasing over time. At 38.9, the median age in 2000 was higher than both the state (37.5) and the nation (35.3) and has been on the rise since 1980 when it was 32.1 (BSB Growth Policy, 2008).

3.5 Housing Stock

The U.S. Census estimates in their 2009-2013 American Community Survey that BSB County had 16,811 housing units with a median value of \$121,900. A further breakdown of the housing units from the census is presented in **Table 3.5-1**. The housing data suggests that over 33 percent of the homes in BSB County were constructed after 1970 and 39 percent were built prior to 1939.

Table 3.5-1. U.S. Census Housing Data; Butte-Silver Bow County

Category	Butte-Silver Bow County	Butte-Silver Bow (balance)	Walkerville, Town
Total Number of Housing Units	16,811	16,311	418
Median Value Housing Units (2009-2013)	\$121,900	\$123,600	\$77,700
Year Structure Built			
2010 or later	99	99	0
2000 to 2009	901	854	47
1990 to 1999	1,264	1,260	4
1980 to 1989	1,063	1,057	6
1970 to 1979	2,225	2,220	5
1960 to 1969	1,243	1,238	5
1950 to 1959	2,179	2,147	32
1940 to 1949	1,280	1,269	11
1939 or earlier	6,475	6,167	308

Source: U.S. Census Bureau, 2015, Quick Facts and 2009-2013 American Community Survey

3.6 Economy and Socioeconomics

Butte, a former copper mining boomtown, was once Montana’s largest city. While copper mining continues on a smaller scale, Butte’s economy is now driven by more diverse sources, such as Health care, retail trade, utilities, and tourism. A town rich in history and possessing one of the largest historical districts in the U.S., Butte has developed a successful “heritage tourism” industry.



Additionally, Butte has attracted several technology-based companies to the area (Montana Department of Labor and Industry, 2012). **Table 3.6-1** presents the top private employers in BSB County in 2008.

After cessation of mining operations, the economy went into a period of accelerated decline beginning in 1983. The county finally reached a 30-year low in its job count in 1986 when the total number of jobs dropped to 15,211. By 1988, mining resumed on a much smaller scale and a trend of slow, but steady growth returned to the community. Total employment grew beginning in 1988 and the county achieved a 30-year high of 19,491 jobs in 1998. Decline returned when closure of a local telecommunications firm and workforce reductions took place at two major corporations in the late 1990’s and into 2001. Employment figures have been creeping upward since that time (BSB Growth Policy, 2008).

The top private employers in 2011 in BSB County reported by the Montana Department of Labor and Industry are: NorthWestern Energy and St. James Healthcare (500 to 999 employees); Acadia Montana, REC Silicon LLC, Montana Resources, Town Pump and Walmart (100 to 249 employees); Aware Inc., BSW, Butte Convalescent Center, Community Counseling & Correction Service, Community Health Center, Easter Seals-Goodwill, Lady of the Rockies Rehab and Living Center, Safeway, and Silver House (100 to 249 employees). **Table 3.6.1** presents economic indicators for BSB County and the Town of Walkerville, from 2009 to 2013.

Table 3.6-1. Economic & Socioeconomic Data; Butte-Silver Bow County

Indicator	State of Montana	Butte-Silver Bow County	Butte-Silver Bow (balance)	Walkerville
Per capita income (2009-2013)	\$25,373	\$23,562	\$23,709	\$18,699
Median household income (2009-2013)	\$46,230	\$38,659	\$38,778	\$31,855
Persons living below poverty level (2009-2013)	15.2%	19.1%	18.5%	39.4%

Source: U.S. Census Bureau, 2015, Quick Facts and 2009-2013 American Community Survey; "--" = not available

3.7 Land Use and Future Development

The BSB Growth Policy recognized that substantial differences exist throughout the county in the intensity of land uses and/or development trends. These land uses range from large tracts of National Forest lands that have very limited or restricted activities, to the built-up urban environment of Butte where nearly 90 percent of the county population resides. The following sections provide details on the planning tools used by BSB County to manage growth.

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 county and city growth policies. Building codes also play an important role to ensure structures are constructed to safety standards.

Growth Policies

BSB County adopted a growth policy in 2008. Two neighborhood plans have also been appended to the growth policy, including Central Butte Neighborhood Plan (2010) and Greely Neighborhood Plan

(2010). The BSB County Growth Policy outlines goals and objectives for disaster and emergency services which lead to safe growth and a resilient community, as outlined below.

Goal 1: Address deficiencies within BSB County land use regulations with respect to the reduction of wildfire in the wildland urban interface including adequate access to subdivisions in rural areas. Implementation strategies to achieve this objective include:

- Develop and maintain an inventory of areas where wildfire risks are present; and,
- Update the BSB County Subdivision Ordinance to reduce the incidence of wildland fire addressing defensible space and access for emergency vehicles.

Goal 2: Improve disaster preparedness and mitigate the potential impacts of catastrophic events in accordance with the following three objectives:

- Maintain up-to-date information regarding hazards and associated risks;
- Engage in “Safe Growth” planning and public information programs that increase public awareness regarding hazards; and
- Advocate for policies which promote disaster resistance and risk reduction.

Implementation strategies to achieve these objectives include: updating the Hazard Mitigation Plan, assessing the earthquake risk in BSB County; seeking hazard mitigation grants to identify local risks and vulnerabilities; and, implementing “Safe Growth” principals to assist with building resilient communities.

Key findings in the BSB Growth Policy analysis indicate that the current location of the local EOC is inadequate to provide the necessary services and, addressing potential hazards “up front” through better building and overall land use design and other preventative measures can results in a cost savings of four times the cost of addressing emergencies after the fact. Since the BSB County PDM Plan was completed in 2010, a new EOC has been constructed to serve the county.

The Town of Walkerville currently does not have a formal growth plan; however, a land use plan has been developed. Much of the available land for development will depend on land availability after the Superfund project is completed. The current land use plan designates the south central and southwest part of Walkerville as Urban Residential, the north central and northwest part of Town as Rural 2 Residential, the northeast section as Industrial, and the southeast corner as open space. The majority of the land is within the residential categories. Once the Superfund project is completed, a revised land use and growth plan may be developed. While the newer areas of the community have experienced new construction and growth, the age and condition of housing stock in the older townsite presents a planning challenge for BSB County (BSB Growth Policy, 2008). Decay of housing stock in much of the area north of Front Street to Walkerville and the upper and lower west side of the urban cluster are contributing to a significant aesthetic crisis and have created an economic development barrier for the community.

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).

BSB County has a Zoning Ordinance, revised in 2005, of which approximately 98 percent of the urban corridor of Butte and 437 acres outside of the urban corridor are regulated. Historically, lands in BSB County were divided into two general categories; urban corridor and rural. However, the community's population has begun to shift to areas around the periphery of the corridor and within this peripheral areas, the built environment is becoming more dense but without the necessary supporting infrastructure. As a result, the new Growth Policy created nine major land use categories to govern future development patterns: residential, commercial, industrial, institutions, open space, Rural Districts for 3-, 10-, and 40- acre developments and Rural Center.

The Town of Walkerville is included in the BSB County zoning regulations.

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.

BSB County controls 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 mitigated including impacts from: flooding, steep slopes and/or areas that are prone for rock falls, landslides or avalanches, high potential for wildfire, subsidence, high water table, and others. This PDM Plan further discusses the natural and man-made hazards BSB County residents are exposed to. The current BSB County Subdivision Regulations were adopted in 2009.

Floodway provisions in the subdivision regulations stipulate the land located in the floodway of a 100-year flood shall not be developed for building purposes. If any portion of a proposed subdivision is within 2,000 horizontal feet and less than 20 vertical feet of a live stream and there are no floodplain maps available, survey data must be provided and the Montana DNRC will determine whether a flood hazard exists.

Areas rated as extreme, high or medium wildland urban interface (WUI) must comply with special design standards including:

- Roof Coverings - must be Class A or B fire-rated roofing materials;
- Access and Evacuation – Roadside vegetation must be maintained so roads will service as escape routes and fire breaks. There must be a minimum of two approach routes to ensure one than one escape route and access routes by emergency vehicles.
- Vegetation Management - A vegetation management plan is required that will reduce fuel loading and hazard rating and provide continuous maintenance of the fuel load. The plan must include guidelines for defensible space, fuel breaks and greenbelts, and a plan for continuous maintenance.

- Water Supply – A fire-fighting water source and access to that source must exist and be maintained as defensible space. Requirements for water supply systems are stipulated and may include fire hydrants or storage tanks. Residential fire sprinkler systems are required.
- Fire Protection Covenants are required stipulating that property owners must maintain fire protection water supplies and fire protection systems (defensible spaces, driveway routes, fuel breaks) in perpetuity.

The subdivision regulations require an Environmental Assessment be completed to evaluate the potential impacts the subdivision would have on:

- Public health and safety (including flooding, earthquake, steep slopes/unstable soils/slides, high water tables, high fire hazard or designated WUI area);
- Surface water (including areas subject to the flood hazard); and
- Topography, geology and soils (including unstable and excessive slopes).

Mitigation measures may be required prior to approval of the subdivision.

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. BSB County has adopted and enforces the state building codes which include the International Building Code, International Residential Code and International Existing 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 BSB 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.

BSB County has adopted floodplain regulations. Floodplain regulations are amended periodically to stay current with statutory amendments or other relevant changes. FEMA digitized hard-copy Flood Insurance Rate Maps (FIRMs) were comfort BSB County in 2012.

Floodplain regulations are enforced through the floodplain administrator in BSB County. BSB County participates in the National Flood Insurance Program.

3.7.2 Future Development

According to the BSB County Growth Policy (2008), the impact on public infrastructure is the primary issue when considering future development. In order to accommodate the continued desire of some to live outside the urban cluster, new development must be managed with a mind to efficient and effective use of public infrastructure and impacts on the environment.

Future development is expected to continue in areas where recent growth has occurred. These areas are primarily on the periphery or outside the urban limits to the north, east and south, including: Beef Trail/Little Basin Creek area; Black Tail Loop area; Bull Run area; Hillcrest Elementary School area; East Ridge area; Hanson Road area; and, Moulton Reservoir area.

In the past 20 years, substantial changes in commercial activities and where they locate have continued to occur. Similar to the redistribution of the population, commercial land uses have also experienced decentralization from the “Uptown” area. Commercial uses are decentralizing from that portion of Harrison Avenue located within one mile of the interstate. The trend is for commercial land uses to locate further south and west of Harrison Avenue.

A review of land uses within BSB County resulted in the land south and west of the interchange of I-90 and I-15 being determined to be the best location for a rural industrial park. A Tax Increment Financing District was created for the Montana Connections Business Development Park and this area will likely see future industrial development.

Section 4.10 presents a hazard analysis of the proposed future development projects in Butte-Silver Bow County.

SECTION 4. RISK ASSESSMENT AND VULNERABILITY ANALYSIS

Butte-Silver Bow 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 Walkerville.

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: hazardous material incidents, wildfire, earthquake, severe weather and drought, transportation accidents, communicable disease, terrorism and violence, and flooding and dam failure. 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 BSB 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 BSB 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 where this information was readily available from the City-County, Town of Walkerville and Montana Cadastral Mapping Program. **Figures 3 and 3A** present the location of

Section 4: Risk Assessment and Vulnerability Analysis

critical facilities in BSB County and Town of Walkerville. 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 BSB County. The Critical Facility section in **Appendix C** presents a key to the bridge inventory. BSB County may wish to enhance the bridge data for the 2021 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. Building exposure in the risk assessment is presented for the consolidated city-county of Butte Silver Bow and the Town of Walkerville.

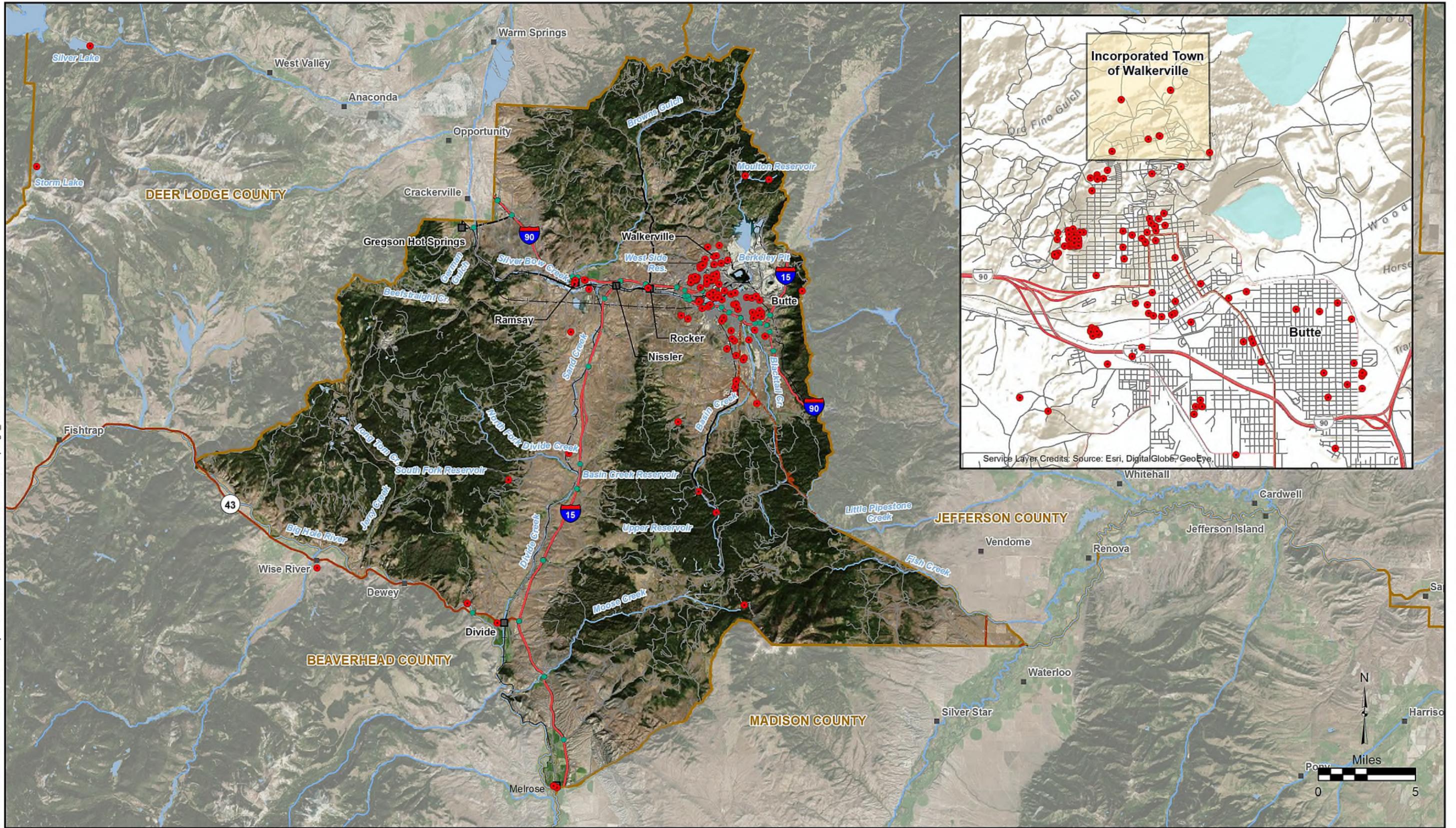
4.1.2 Vulnerable Population

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 BSB County and the Town of Walkerville.

4.1.3 Hazard Identification

The 2010 BSB County Hazard Mitigation Plan (Tetra Tech, 2010) identified 20 hazards affecting BSB County and Town of Walkerville (avalanche, aviation accident, communicable disease, dam failure, drought, earthquake, extended coal and winter storms, flooding, hazardous material release, heat waves, landslides, near surface ground failure and subsidence, severe thunderstorm wind and hail, strikes and civil unrest, structure fires, terrorism and violence, volcanic ash and wildfire). These hazards were reviewed for the 2016 PDM update by the Steering Committee who considered what other emerging hazards might be of consequence since development of the original PDM Plan.

Hazards profiled in the 2016 update include those from the 2010 Hazard Mitigation Plan with the following changes: aviation accidents are included in the transportation accident hazard profile (which also includes two new hazards, railroad and highway accidents); flooding and dam failure are combined into one hazard profile; extended cold and winter storms, drought, heat waves, and thunderstorm winds and hail are combined into one hazard profile; and terrorism, violence, strikes, and civil unrest are combined into one hazard profile. The Steering Committee decided that several hazards should be de-emphasized in the 2016 PDM Plan because they either effect only a small segment of the population and/or occur infrequently with little damage, including; avalanche, landslides, near surface ground failure and subsidence, structure fire, and volcanic ash.

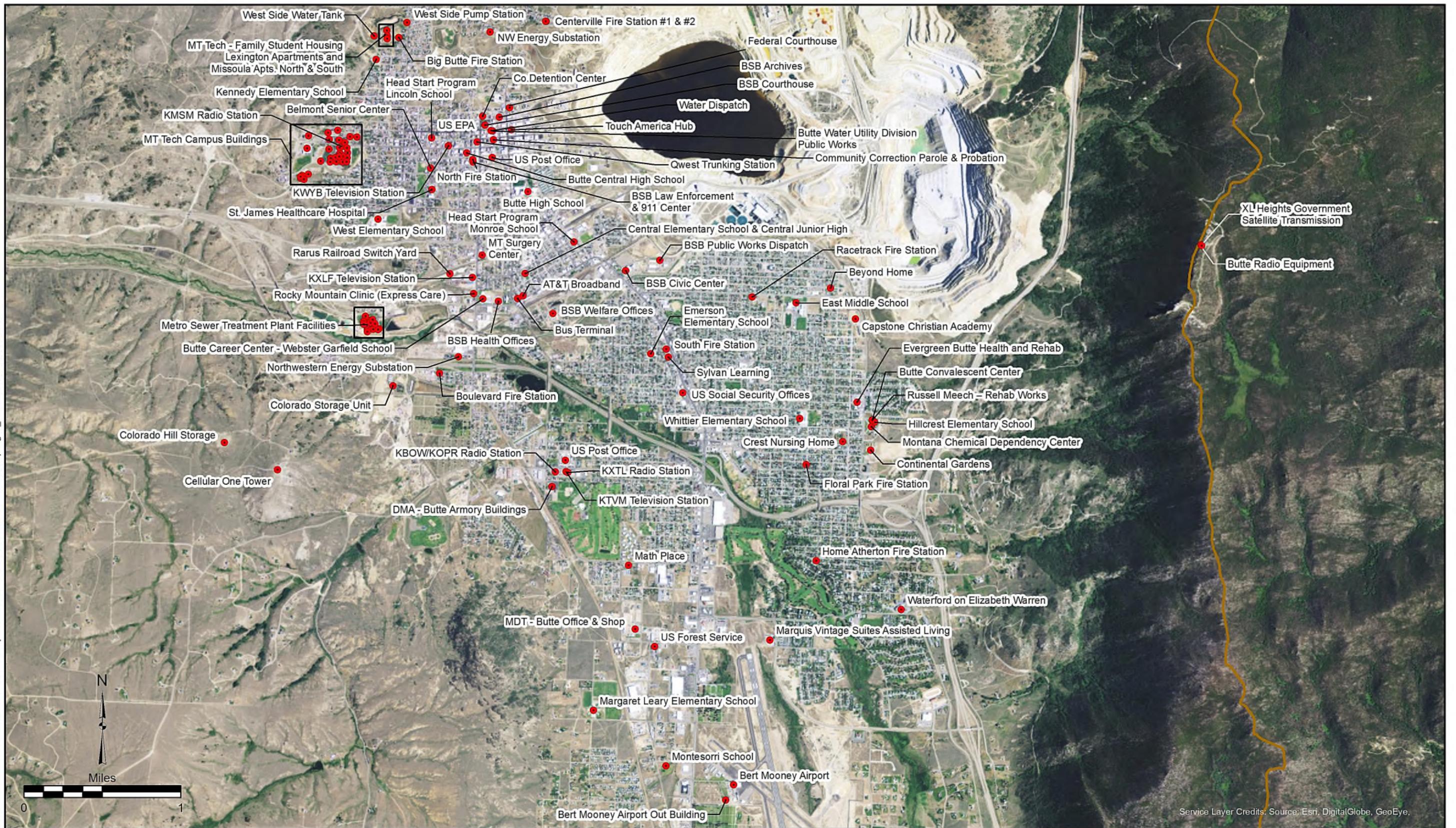


Legend

- Critical Facility
- County Seat
- △ Incorporated Place
- Place Name
- Bridge
- Interstate
- Primary Route
- Secondary Route
- Other Route
- + Railroad
- Lake/Reservoir
- River/Stream
- County



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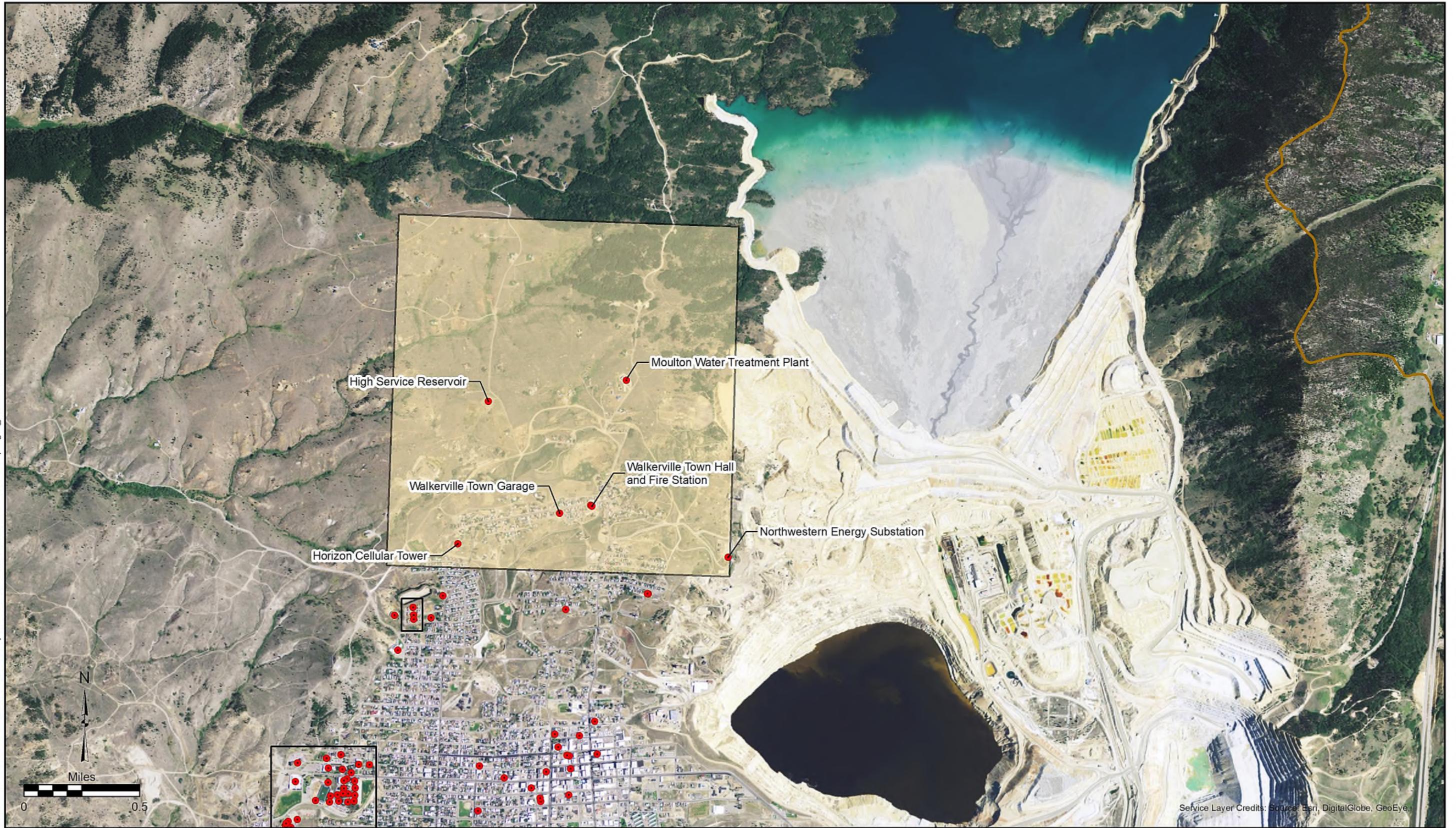
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- Critical Facility

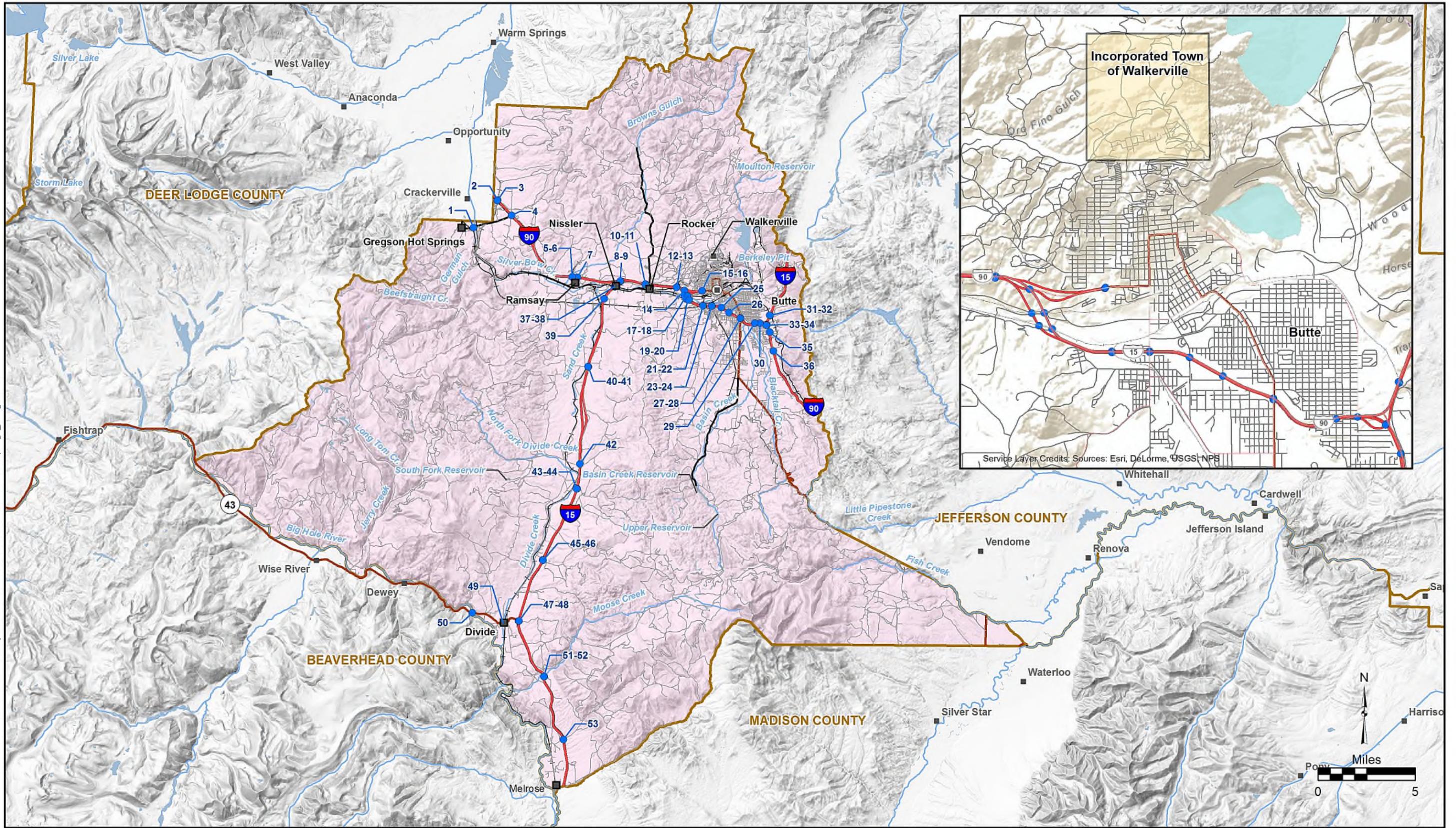
April 2016
Figure 3A
Butte Critical Facilities
Butte-Silver Bow County
Pre-Disaster Mitigation Plan



Legend

- Critical Facility
- Incorporated Town of Walkerville

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Legend

- ⊙ County Seat
- ▲ Incorporated Place
- Place Name
- Bridge
- Interstate
- Primary Route
- Secondary Route
- Other Route
- Railroad
- 🌊 Lake/Reservoir
- 🌊 River/Stream
- 📐 County



April 2016

Figure 4

Bridge Inventory
Butte-Silver Bow County
Pre-Disaster Mitigation Plan

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.

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

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was assessed qualitatively based on regional history and other contributing factors. Probability was broken down as follows:

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

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

- $(\text{Property Damage} / \text{Number of Incidents}) / \$ \text{ of Building Stock Exposure}$

Future Development

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

4.1.5 Hazard Ranking and Priorities

In ranking the hazards, the Steering Committee 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	

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Table 4.1-2. Calculated Priority Ranking Index Summary; Butte-Silver Bow County

Hazard	Probability	Magnitude/Severity	Warning Time	Duration	CPRI Score
Hazardous Material Incidents	Highly likely	Critical	< 6 hours	< 24 hours	3.70
Wildfire	Highly likely	Critical	< 6 hours	> 1 week	3.50
Highway Accidents	Highly likely	Limited	< 6 hours	< 24 hours	3.20
Severe Summer Weather	Highly likely	Limited	< 6 hours	< 6 hours	3.10
Severe Winter Weather	Highly likely	Limited	12 - 24 hours	< 1 week	3.00
Earthquake	Likely	Critical	< 6 hours	< 6 hours	2.95
Terrorism, Violence, Civil Unrest	Likely	Critical	< 6 hours	< 6 hours	2.95
Aircraft Accidents	Likely	Critical	< 6 hours	< 6 hours	2.95
Railroad Accidents	Possible	Critical	< 6 hours	< 1 week	2.70
Structure Fire	Likely	Limited	< 6 hours	< 6 hours	2.65
Dam Failure	Possible	Limited	< 6 hours	> 1 week	2.65
Communicable Disease	Likely	Limited	>24 hours	> 1 week	2.50
Drought	Likely	Negligible	>24 hours	> 1 week	2.20
Flooding	Possible	Limited	12 - 24 hours	< 1 week	2.10
Volcanic Ash	Possible	Negligible	6 - 12 hours	< 1 week	1.95
Subsidence	Possible	Negligible	< 6 hours	< 6 hours	1.90
Landslide	Possible	Negligible	< 6 hours	< 6 hours	1.90
Avalanche	Possible	Negligible	< 6 hours	< 6 hours	1.90

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 Steering Committee felt that with the CPRI ranking did not accurately represent BSB County's priorities; therefore, the list of hazards was re-prioritized and several hazards were combined into one profile, as shown below. The remainder of this section contains the hazard profiles in this order.

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

Several hazards profiled in the 2010 Hazard Mitigation Plan were deemed low priority (Subsidence, Structure Fire, Avalanche, and Landslide) because they effected only a localized segment of the population and/or occurred infrequently with little damage, and are therefore included in **Appendix C**. The PDM Steering Committee requested that the Volcanic Ash hazard not be included in this 2016 PDM Update.

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 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

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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 BSB 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 BSB 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

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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 Hazardous Material Incidents

CPRI SCORE = 3.7

Description and History

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 industrial chemicals, are commonly stored and used in BSB 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 or pipeline ruptures contaminating land and water.

Hazardous material incidents in BSB County have mostly been minor. Records of hazardous material events from 1990 to 2015, available from the National Response Center database, are summarized in **Table 4.2-1**.

Table 4.2-1. Butte-Silver Bow County Hazardous Material Incidents; 1990 – 2015

Incident Date	Type of Incident	Incident Cause	Location	Nearest City	Suspected Responsible Party	Quantity Spilled/ Material Name
1/8/1990	Fixed	Unknown	Vermilion Block 114	Butte	Rhone Poulenc	Radionuclides
3/9/1990	Railroad	Transport Accident	Vernor Slough at UNOCAL Trail Mile	Silver Bow	Union Pacific Railroad	Phosphoric Acid
1/8/1991	Fixed	Operator Error	119130 German Gulch Rd	Silver Bow	Rhone Poulenc	Phosphorus, Yellow
1/31/1991	Mobile	Operator Error	112000 Rocker Interchange	Butte	Broadway Flying J	Oil: Diesel
5/8/1991	Fixed	Operator Error	119130 German Gulch Rd	Silver Bow	Rhone Poulenc	Phosphorus
8/7/1991	Fixed	Equipment Failure	119130 German Gulch Rd	Silver Bow	Rhone Poulenc	Elemental Phosphorus
11/7/1991	Mobile	Unknown	Nissler Junction I-15 N & I-90 W	Butte	Matlack Inc.	Sodium Hydrosulfide Solution
1/25/1992	Fixed	Equipment Failure	119130 German Gulch Rd	Butte	Rhone Poulenc	Phosphorus, White
2/22/1992	Fixed	Equipment Failure	119130 German Gulch Rd	Butte	Rhone Poulenc	Phosphorus
3/4/1992	Fixed	Equipment Failure	119130 German Gulch Rd	Silver Bow	Rhone Poulenc	Sulfuric Acid
6/22/1992	Fixed	Operator Error	119130 German Gulch Rd	Butte	Rhone Poulenc	Phosphorus, White
12/1/1992	Unknown Sheen	Unknown	1301 Dakota St.	Butte	-	Gasoline: Automotive (4.23G PB/G)
3/13/1993	Fixed	Equipment Failure	119130 German Gulch Rd	Butte	Rhone Poulenc	Phosphorus, Red
8/2/1993	Fixed	Equipment Failure	Intersection Sampson & Oregon	Butte	BSB County	Swimming Pool Chlorine
10/23/1993	Pipeline	Unknown	109 ½ Ruby St.	Butte	BSB County	Natural Gas
11/13/1993	Railroad	Unknown	Montana Subdivision	Maiden Rock	Union Pacific Railroad	
11/24/1993	Mobile	Unknown	Off-Ramp From I-90 Onto I-15	Butte	Rainbow Trucking	Oil: Diesel
3/8/1994	Mobile	Equipment Failure	121000 Brown Gulch Rd.	Butte	Special Resources Management	Gasoline: Automotive (Unleaded)
4/21/1994	Fixed	Equipment Failure	1301 Four Mile Vue	Butte	Buttrey's Food & Drug	Ammonia, Anhydrous

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Table 4.2-1. Butte-Silver Bow County Hazardous Material Incidents; 1990 - 2015

Incident Date	Type of Incident	Incident Cause	Location	Nearest City	Suspected Responsible Party	Quantity Spilled/ Material Name
9/27/1996	Fixed	Operator Error	3318 Wynne Ave.	Butte	-	P-Chlorophenol
4/7/2000	Mobile	Equipment Failure	Alley Behind 1916 S. Jackson St.	Butte	Montana Power Co.	Mix of Spike, Parmex and Water
6/12/2000	Mobile	Transport Accident	On-Ramp I-15 To I-90	Butte	Al Pacific Powder Co.	Explosive Blasting Type E "Class 1.5D"
5/6/2001	Storage Tank	Dumping	North End Berkley Pit Near Acid Lake	Butte	Montana Resources	Oil, Misc: Motor; Tires; Caustic Reagents Used in Mining
8/6/2001	Fixed	Equipment Failure	119130 German Gulch Rd	Silver Bow	Rhodia	Phosphorus, White
6/1/2002	Pipeline	Other	825 W. Galena	Butte	Northwestern Energy	Natural Gas
3/7/2003	Mobile	Transport Accident	I-90 on top of Homestake Pass	Butte	Interstate Brands Corp	Oil: Diesel
2/19/2004	Mobile	Equipment Failure	I-15 at MM 127 West Bound	Butte	Montana DOT	Oil: Diesel
9/22/2004	Pipeline	Operator Error	25 Bennett Street	Butte	-	Natural Gas
7/13/2005	Pipeline	Unknown	Silver Bow Creek	Ramsey	Rhodia	Phosphorus
7/24/2005	Drum	Unknown	1285 Harrison	Butte	-	55 gallons cooking oil
8/6/2005	Mobile	Unknown	3100 Harrison	Butte	-	1 gallon Gasoline
9/13/2005	Fixed	Unknown	300 Block West of Broadwater St.	Butte	-	Mercury
10/12/2005	Mobile	Unknown	1301 Harrison	Butte	-	50 gallons Diesel
7/11/2006	Mobile	Unknown	3100 Harrison	Butte	-	5 gallons Oil
8/12/2006	Storage Tank	Equipment Failure	3909 Wynne Ave.	Butte	Con-Way Freight	2,4-Dichlorophenoxyacetic Acid
11/1/2006	Fixed	Building Fire	1500 Shirley Way	Butte		55 gallons Motor Oil
1/10/2007	Mobile	Other	2610 Harrison Ave.	Butte	Core-Mark	Oil: Diesel
4/8/2007	Fixed	Unknown	121 Maryland St.	Butte	Northwestern Energy	Natural Gas
5/3/2007	Fixed	Equipment Failure	112000 Rocker Interchange & I-90	Butte	Flying J	Oil: Diesel
9/8/2007	Mobile	-	I-15 Southbound		-	35 gallons Diesel
11/13/2007	Fixed	-	901 E. Front	Butte	-	10 gallons Gasoline
3/7/2008	Mobile	-	Hwy 55 MM 2		-	1,000 gallons asphalt
3/14/2008	Mobile	-	Buxton Road RR Crossing		-	6 gallons Diesel
3/21/2008	Fixed	-	1900 S. Montana	Butte	-	1 gallon Chemical
6/7/2012	Mobile	Transport Accident	Hwy 38 At MM 70	Butte	TECE Trucking	100 Gallons Magnesium Chloride
1/27/2015	Mobile	Other	1829 Adams Ave	Butte	Private Citizen	1 Cup Other Oil (Transmission Fluid)
4/30/2015	Railroad	Derailment	Main Track	Butte	Unknown	Unknown Amount Grain
8/13/2015	Fixed	Dumping	1201 Centennial Ave	Butte	Ranch Land Packing	Unknown Amount Animal Processing Waste

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

Other hazardous material incidents in BSB County not listed in the NRC databases include:

- January 12, 1989 – While demolishing a building on South Utah in Butte, 200 gallons of ammonia was spilled from an old tank.

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- August 15, 1989 – A boil order was in effect for Butte residents due to inadequate chlorine levels. These levels were blamed on the drought and an old water treatment system.
- January 23, 1995 – An anhydrous ammonia tank leaked at the MBMG and led to an evacuation of their building at Montana Tech.
- October 18, 1997 – Sulfuric/nitric acid was found leaking out of truck at the Flying J truck stop near Rocker.
- March 3, 1998 – A methamphetamine lab was discovered at the War Bonnet Inn in Butte. The nearby rooms were evacuated, and a law enforcement officer received medical treatment.
- March 26, 1998 – At a construction site in Butte, a bucket of epoxy resin sealer was accidentally mixed with industrial paint enamel. The chemical reaction caused the mixture to bubble and emit fumes. A worker then dumped the mixture into a nearby dumpster. The surrounding 1-block area was evacuated, and one person complained of respiratory problems.
- June 2001 – Health concerns were raised over mining tailings blowing from the Yankee Doodle Tailings Pond. The tailings are known to have substances that can be hazardous to humans such as arsenic, lead, zinc, and cadmium.

Steering Committee members indicated that hazardous material sites of specific concern included the Beal Mountain Mine and a small marshalling yard west of Butte at the junction of north-south and east-west railroads where numerous rail cars are being stored.

Research conducted for the Transportation Accident hazard (see *Plan Section 4.6*) indicated that between 1990 and 2015 there were 11 railroad accidents where a total of 50 cars carrying hazardous materials derailed. Out of these derailments, 23 railcars carrying hazardous materials were damaged but only one car actually had a release. In the derailment which occurred on February 25, 1994, 200 gallons of crude oil spilled from a railcar.

The U.S. Environmental Protection Agency maintains the Toxic Release Inventory (TRI) of facilities that have released contaminants to the environment. TRI listings for BSB County are presented in **Table 4.2-2**.

Table 4.2-2 - Toxic Release Inventory – Total Aggregate Releases; 2010-2014

Facility Name & Address/ Year	Air Emissions (Pounds)	Surface Water Emissions (Pounds)	Releases to Land (Pounds)	Underground Injection (Pounds)	Transfer Off-Site to Disposal (Pounds)	Total Releases (Pounds)
REC Silicon, 119140 Rick Jones Way, Butte						
2014	250	5	0	NR	24,945	25,200
2013	250	5	0	NR	28,129	28,384
2012	250	5	0	NR	24,865	25,120
2011	250	5	0	NR	29,345	29,600
2010	250	5	0	NR	16,785	17,040
Montana Resources LLP, 600 Shields Ave., Butte						
2014	NR	NR	18,528,871	NR	NR	18,528,871
2013	NR	NR	18,252,986	NR	NR	18,252,986
2012	250	NR	19,178,279	NR	NR	19,178,279
2011	250	NR	17,819,737	NR	NR	17,819,737



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Table 4.2-2 - Toxic Release Inventory – Total Aggregate Releases; 2010-2014

Facility Name & Address/ Year	Air Emissions (Pounds)	Surface Water Emissions (Pounds)	Releases to Land (Pounds)	Underground Injection (Pounds)	Transfer Off-Site to Disposal (Pounds)	Total Releases (Pounds)
2010	250	NR	18,894,016	NR	NR	18,894,016
Montana Precision Products, 119800 Rick Jones Way, Butte						
2014	511	10	10.5	NR	15	546.5
2013	255	5	5	NR	5	270
2012	10	NR	NR	5	NR	15
2011	NR	10	NR	NR	250	265
2010	NR	NR	NR	5	NR	5

Source: U.S. EPA, 2016; (http://www.epa.gov/enviro/html/tris/tris_query.html)

Many facilities in BSB County sell or use hazardous materials including the municipal water treatment facilities, industrial businesses, chemical dealers, and fuel distributors. Locations of facilities in BSB County with Tier II reporting requirements are listed in **Table 4.2-3**.

Table 4.2-3. Butte-Silver Bow County Tier 2 Hazardous Material Reporters

Facility Name	Address	City
American Welding & Gas – Silvertip Propane	112 N Parkmont	Butte
Amerigas Propane 5166	1911 Meadowlark Ln.	Butte
AT&T MT3190	-	Butte
Basin Creek Reservoir	700 Basin Creek Rd.	Butte
Buckley Powder Co. MRI	600 Shields Ave.	Butte
Butte Parking Garage	1301 S. Dakota St.	Butte
Butte Treatment Lagoons – Atlantic Richfield Co.	1146 Centennial Ave.	Butte
Century Link Butte Main Central Office	200 W. Broadway St.	Butte
Century Link Butte South Co.	3715 Harrison Ave.	Butte
Fickler Oil Company Inc.	1480 Continental Drive	Butte
GCR Tire Centers	1304 Harrison Ave.	Butte
General Distributing Butte	701 S. Warren	Butte
Nelson Brothers Mining Services	600 Shields Ave.	Butte
Norco Inc.	1911 Meadowlark, Suite A	Butte
Northwestern Energy Montana Data & Customer Care Center	5155 Harrison Ave.	Butte
Pacific Steel and Recycling #6	905 Gaylord St.	Butte
REC Silicon	119140 Rick Jones Way	Silver Bow
Silvertip Propane – Butte Bulk Plant	112 N. Parkmont	Butte
SkyWest Airlines dba Delta Connection	101 Airport Road	Butte

Source: BSB County OEM, 2016

Regional hazardous-material response trailers closest to BSB County are positioned in Helena and Bozeman.

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



Vulnerability and Area of Impact

Transportation of hazardous materials through BSB County on highways, pipelines, and by the railroads could result in an accident or derailment that would have the potential to impact BSB County residents. Large quantities of industrial chemicals are stored in various locations throughout the county. Although there is no history of significant incidents, the potential for a hazardous material accident in BSB County is present.

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. Some hazardous materials occur in the gaseous phase and are denser than air; therefore, having the potential to collect in low places.

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. 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 active TRI facilities in BSB County, as shown in **Table 4.2-3**.

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.

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 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 4.2-4** represent exposure risk (vulnerability) in the hazard area. **Figures 5 and 5A** presents the hazardous material buffer in BSB County and Walkerville, respectively, and show the vulnerability of critical facilities to hazardous material incidents.

Section 4: Risk Assessment and Vulnerability Analysis

Table 4.2-4. Butte-Silver Bow County Vulnerability Analysis; Hazardous Material Incidents

Category	Butte-Silver Bow County Total	Walkerville, Town
Residential Property Exposure \$	\$847,912,576	\$20,505,141
# Residences At Risk	8,575	354
Commercial, Industrial & Agricultural Property Exposure \$	\$540,025,426	\$2,022,719
# Commercial, Industrial & Agricultural Properties At Risk	2,142	152
Critical Facilities Exposure Risk \$	\$426,582,599	\$8,260,031
# Critical Facilities At Risk	139	6
Bridge Exposure \$	\$15,428,580	0
# Bridges At Risk	53	0
Persons At Risk	26,451	812
Persons Under 18 At Risk	5,477	191

The GIS analysis indicates that there are over 53,305 acres in BSB County in the hazardous material buffer (11.6 percent) including 8,575 residences, 2,142 commercial, industrial and agricultural buildings, and 139 critical facilities. The Hazardous Material Incident Section in **Appendix C** lists the critical facilities and bridges within the hazardous material transportation buffer.

Probability and Magnitude

According to the U.S. Department of Transportation, Office of Hazardous Materials Safety, BSB County has had numerous hazardous material release with reported damages in the past 25 years, as shown in **Table 4.2-5**.

Table 4.2-5. Butte-Silver Bow County Hazardous Material Incidents with Damages

Date	Location	Carrier	Quantity Released	Commodity Released	Damages	Mode of Transport
1/22/1990	Silver Bow	Union Pacific Railroad	0.062 gal	Phosphoric Acid	\$1,000	Rail
3/9/1990	Silver Bow	Union Pacific Railroad	200 gal	Phosphoric Acid	\$1,190	Rail
10/15/1990	Silver Bow	Union Pacific Railroad	2 gal	Sodium Hydroxide	\$200	Rail
4/3/1991	Butte	YRC Inc.	4 gal	Weed Killing Liquid	\$240	Highway
4/25/1992	Butte	Consolidated Freightways	0.25 gal	Nitric Acid (Over 40%)	\$700	Highway
8/31/1992	Butte	Veolia ES Technical	0.75 gal	Flammable Liquids	\$100	Highway
2/22/1994	Butte	YRC Inc.	0.016 gal	Isopropyl Alcohol	\$315	Highway
2/23/1994	Butte	Consolidated Freightways	2.5 gal	Methyl Cyanide	\$900	Highway
3/8/1994	Butte	Veolia ES Technical	20 gal	Gasoline	\$50	Highway
10/29/1997	Butte	YRC Inc.	1.5 gal	Corrosive Liquid	\$425	Highway
12/28/1998	Butte	UPS	0.312 gal	Ethanolamine	\$125	Highway
6/12/2000	Butte	Alaska Pacific Powder	300 lbs	Blasting Agent	\$30,500	Highway
3/27/2001	Butte	YRC Inc.	0.375 gal	Hydrofluoric Acid	\$380	Highway
11/15/2001	Butte	FedEx Ground	1 gal	Zinc Chloride	\$525	Highway
5/2/2002	Butte	FedEx Ground	0.333 gal	Flammable Liquids	\$525	Highway
6/30/2002	Butte	Werner Enterprises Inc.	27 gal	Flammable Liquids	\$4,500	Highway
7/13/2002	Butte	Con Way Freight	0.75 gal	Potassium Hydroxide	\$200	Highway
1/7/2003	Butte	Con Way Freight	5 gal	Flammable Liquids	\$25	Highway
1/9/2003	Butte	Con Way Freight	0.016 gal	Caustic Alkali Liquids	\$200	Highway
3/7/2003	Butte	Con Way Freight	1 gal	Hydrogen Peroxide	\$50	Highway
3/14/2003	Butte	Con Way Freight	0.5 gal	Oxidizing Liquid	\$50	Highway
3/27/2003	Butte	FedEx Ground	0.047 gal	Flammable Liquids	\$525	Highway



Section 4: Risk Assessment and Vulnerability Analysis

Table 4.2-5. Butte-Silver Bow County Hazardous Material Incidents with Damages

Date	Location	Carrier	Quantity Released	Commodity Released	Damages	Mode of Transport
4/8/2003	Butte	FedEx Ground	1 gal	Corrosive Liquid	\$525	Highway
5/27/2003	Butte	FedEx Ground	0.132 gal	Sodium Hydroxide	\$525	Highway
5/30/2003	Butte	Con Way Freight	0.047 gal	Flam. Resin Solution	\$5	Highway
6/10/2003	Butte	Con-Way Freight Inc.	0.5 gal	Flammable Liquids	\$25	Highway
7/26/2003	Butte	Con Way Freight	5 lbs	Nitrates Inorganic	\$50	Highway
8/7/2003	Butte	Con Way Freight	0.5 gal	Flammable Liquids	\$50	Highway
10/13/2003	Butte	FedEx Ground	0.062 gal	Flammable Liquids	\$525	Highway
3/9/2004	Butte	Con Way Freight	2 lbs	Sodium Hydroxide	\$100	Highway
4/5/2004	Butte	Con Way Freight	0.25 gal	Hydrogen Peroxide	\$100	Highway
4/13/2004	Butte	Con Way Freight	0	Hydrogen Peroxide	\$100	Highway
4/23/2004	Butte	FedEx Ground	0.031 gal	Flammable Liquids	\$525	Highway
5/19/2004	Butte	Con Way Freight	0.25 gal	Hydrogen Peroxide	\$100	Highway
6/22/2004	Butte	Con Way Freight	0.25 gal	Printing Ink	\$1,000	Highway
7/8/2004	Butte	Con Way Freight	0.023 gal	Corrosive Liquid	\$50	Highway
8/14/2004	Butte	Con Way Freight	0.25 gal	Corrosive Liquid	\$500	Highway
9/8/2004	Butte	Con Way Freight	0.008 gal	Corrosive Liquid	\$20	Highway
9/14/2004	Butte	Con Way Freight	5 gal	Printing Ink	\$100	Highway
9/16/2004	Butte	Con Way Freight	0.016 gal	Corrosive Liquid	\$25	Highway
12/3/2004	Butte	Con Way Freight	0.016 gal	Corrosive Liquid	\$50	Highway
12/14/2004	Butte	Con Way Freight	1.5 lbs	Sodium Hydroxide	\$100	Highway
7/23/2007	Butte	Con Way Freight	0.039 gal	Amines Liquid	\$1,000	Highway
7/25/2007	Butte	YRC Worldwide Inc.	5 gal	Corrosive Liquids	\$1,000	Highway
7/30/2008	Butte	Union Pacific Railroad	1.25 lbs	Sulfur Molten	\$3,800	Rail
2/1/2010	Butte	YRC Worldwide Inc.	0.125 gal	Sodium Hydroxide	\$590	Highway
6/16/2011	Butte	Union Pacific Railroad	5 gal	Sodium Hydroxide	\$3,500	Rail
2/14/2012	Butte	BNSF	0.25 gal	Corrosive Liquids	\$1,000	Rail
2/5/2013	Silver Bow	BNSF	2 gal	Corrosive Liquids	\$2,206	Rail
4/30/2014	Butte	BNSF	0.125 gal	Diesel Fuel	\$1,200	Rail
8/8/2014	Butte	BNSF	2 gal	Corrosive Liquids	\$2,005	Rail
1/20/2015	Butte	BNSF	0.25 gal	Corrosive Liquids	\$1,500	Rail
TOTAL					\$ 65,001	

Source: U.S. Dept. Transportation, 2016; <https://hazmatonline.phmsa.dot.gov/IncidentReportsSearch/IncrSearch.aspx>

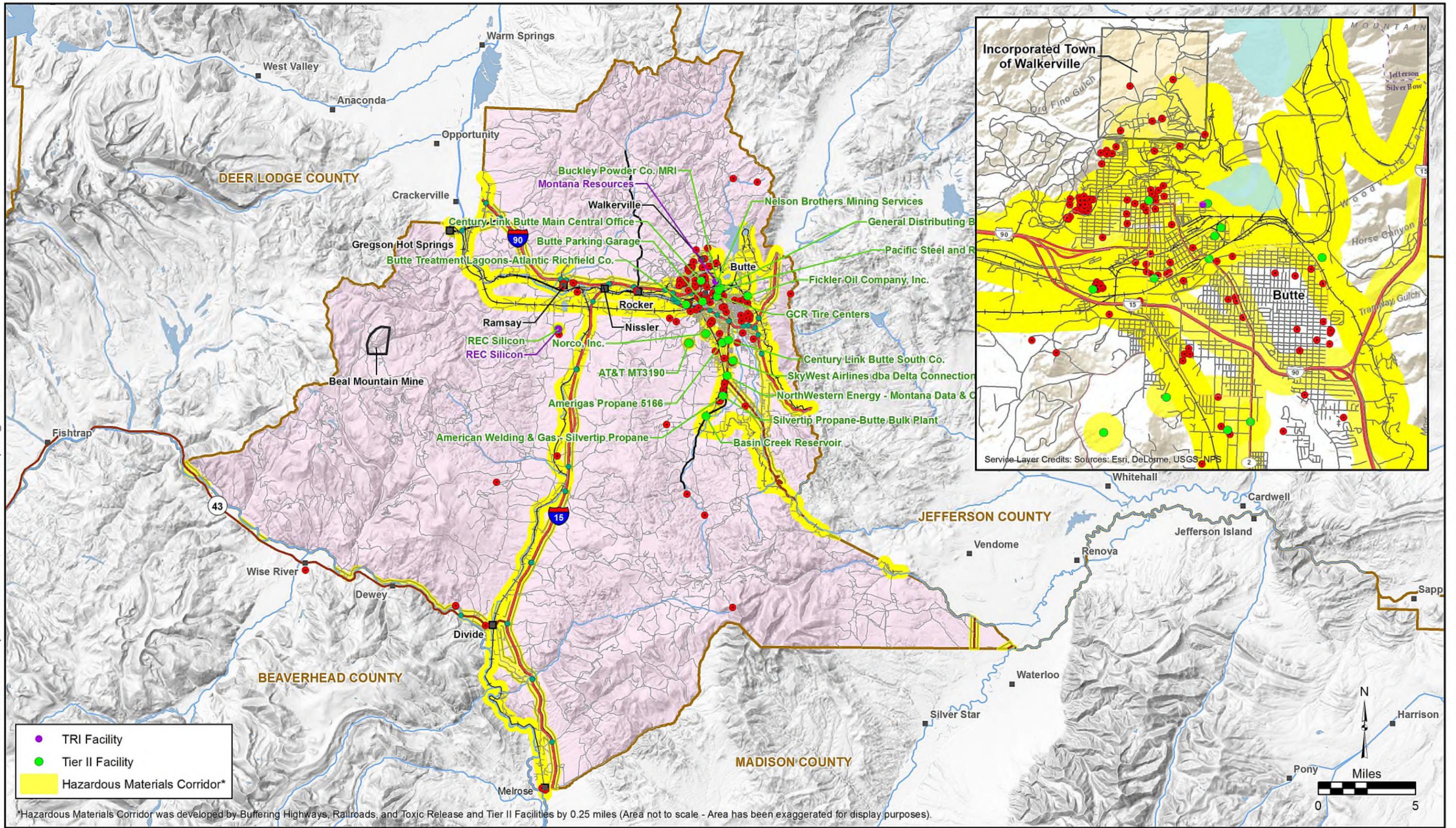
Notes: LGS = liquid-gas ; SLB = solid-pounds

The history of hazardous material events in BSB County indicates 48 incidents have occurred over the past 25 years. Therefore, the probability of future events is rated as “highly likely”. The PDM Steering Committee also rated this hazard as “highly likely”. The magnitude of any hazardous material event would depend on the amount and material spilled.

Future Development

BSB 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.

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Legend

- | | | | | |
|---------------------|----------------------|-----------------|-------------------|------------------|
| ● Critical Facility | △ Incorporated Place | ● Bridge | — Secondary Route | ☪ Lake/Reservoir |
| ⊙ County Seat | ■ Place Name | — Interstate | — Other Route | — River/Stream |
| | | — Primary Route | — Railroad | □ County |

4.3 Wildfire

CPRI SCORE = 3.5

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 4.3-1** 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 4.3-1. 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 device properly installed, maintained and in effective working order.

Section 4: Risk Assessment and Vulnerability Analysis

Table 4.3-1. Warning, Advisories and Restrictions for Wildfire

Warning/Advisory/Restriction	Description
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)

BSB County has large areas of government-owned lands. The federal government manages approximately 51.0 percent of the total land in the County including portions of the Beaverhead-Deerlodge National Forest (189,205 acres) and BLM land (45,253 acres). The State of Montana manages a 6.2 percent of the acreage. This scattering of government and private ownership can present unique firefighting challenges.

BSB County has witnessed a number of wildfires that have destroyed property and affected wildlife habitat, scenic resources, and air quality. Between 1968 and 2005, a total of 2,062 fires burned 171,459 acres in the county. The majority of these fires occurred in the month of August and were caused by lightning (53%) or humans (47%). The wildfires were generally less than one acre in size and were extinguished within one day. **Table 4.3-2** presents wildfire listings from the Montana DNRC over 10 acres with statistics on structures lost and suppression cost where available.

Table 4.3-2. Wildfire Listings >10 Acres in Butte-Silver Bow County

Date	Name	Cause	Structures Lost	Acres	Suppression Cost
5/6/1998	UP MMP 381	Railroads	0	195	\$168
7/7/2008	Durant Canyon 08	Railroads	0	10	\$24,718
7/31/2008	Pump Station	Powerlines	0	26	\$24,055
7/3/2012	Buxton	Fireworks	0	59	-
TOTAL			0	290	\$48,941

Source: DNRC, 2015; 2010 BSB County Hazard Mitigation Plan. Notes: “-” indicates no data available

The Butte-Jefferson Ranger District of the USFS, Beaverhead-Deerlodge National Forest provided wildfire data for BSB County. The data indicates that 225 fires have occurred in the past 30 years. Of these, only nine have been over 10 acres. Details are shown below in **Table 4.3-3**.

Table 4.3-3. U.S. Forest Service Wildfire Listings >10 Acres in Butte-Silver Bow County

Date	Name	Cause	Acres	Suppression Costs
10/25/1987	-	Debris burning	16	\$1,300
10/26/1987	-	Miscellaneous	35	\$4,000
10/27/1987	-	Campfire	30	\$1,800
8/19/1990	Pandora	Miscellaneous	154	\$52,000
8/1/1996	Feely	Lightning	15	\$9,400
5/6/1998	Cluster	Railroad	40	\$2,500
4/8/2001	Divide Pump	Debris burning	10	\$100
7/31/2008	Pump Station	Equipment use	176	\$289,000
3/7/2012	Buxton	Miscellaneous	70	\$10,000
TOTAL			546	\$370,100

Source: USFS, Beaverhead-Deerlodge National Forest, Butte-Jefferson Ranger District, 2016. “-” = not known

Section 4: Risk Assessment and Vulnerability Analysis

BSB County was had two federal disaster declarations from wildfire, in 1994 and 2000. These events were part of larger state-wide disaster declarations. A description from the Montana Standard of one significant wildfire in BSB County is presented below.

July 31, 2008 – Pump Station Fire. The wildfire started near Divide, north of Montana Highway 43, near the old Divide Pump Station. It burned 164 acres on private, state and BLM land and forced temporary evacuation of a number of residences in the area. Structure protection measures were implemented and no structures were lost or damaged. The cause of the fire was thought to have started while a NorthWestern Energy employee was working at a transfer station near the pump house. An electrical spark from the transfer station may have ignited the dry brush. (Montana Standard, *Wildfire Near Divide Nears Full Containment*, August 5, 2008.

BSB County updated their non-regulatory Community Wildfire Protection Plan (CWPP) in 2005 (Fox Logic LLC, 2005). **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 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. 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 location in the WUI in close proximity to the public land boundary. A significant loss of life could occur to residents, firefighters, and others who are in the wildfire area and do not evacuate.

Forests around BSB County are just coming out of a period of extensive insect damage which caused significant mortality. Spruce budworm and mountain pine beetle decimated some 3.5 million acres across western Montana with the Butte, Helena, and Deer Lodge areas hardest hit (NPR, February 11, 2010). Insect-killed forests significantly increase the fuel load that is vulnerable to wildfire. The Thompson Creek Park on Roosevelt Drive is a municipal recreation area with 75 acres of forested land that has been affected by beetle-kill.

A large percentage of the watershed for the public water supply is located within the Beaverhead-Deerlodge National Forest. If a fire were to occur in that area, Butte’s water supply could become contaminated. Fuel mitigation projects completed in the Basin Creek drainage in recent years have reduced this risk.

Often regional electric infrastructure passes through wildland and non-irrigated agricultural areas. In particular, the electric substations, transmission lines, fuel tanks, and radio transmission towers are not often equipped to withstand the heat from a wildfire. A wildfire could disrupt electricity or communications should this infrastructure be damaged.

The trend in climatic conditions in recent years has had major implications for wildland fire severity.

Probability and Magnitude

Butte-Silver Bow’s history with wildfires, the mountainous terrain, recent insect infestations, and areas of the county encompassed by public land has prompted the community to identify wildfires as a significant hazard. Other concerns include air and water pollution from wildfires. Smoke from fires both within and outside of BSB County can create poor air quality. Sensitive groups, such as the elderly and asthmatics, can be affected. Although the primary concern is to structures and the interface residents, most of the costs associated with fires, come from firefighting efforts. Wildfires can also have a significant impact on the regional economy with the loss of timber, natural resources, recreational opportunities, and tourism.

Property damage is difficult to obtain for wildfires since it is typically the forest and agricultural resources that sustain the damage. 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. **Tables 4.3-2 and 4.3-3** indicate that most fires in BSB County are contained at less than one acre in size and no residential structures have been lost. Suppression costs have amounted to only around \$500,000 over the past 20 years.

Wildfire does not present a uniform risk across BSB County. To perform the PDM analysis for the wildfire hazard, the WUI layer from the County’s CWPP (Fox Logic, 2005) was used. This WUI layer was developed by generating a model that assessed the present fire hazard then correlating this exposure to the WUI. The defined BSB County WUI priority zones and three existing GIS layers/data in addition to information provided by local stakeholders, universities, and federal and state land management agencies were used to complete the modeling process for the CWPP. The resulting WUI map used for the PDM analysis was adjusted by project stakeholders who felt the Butte urban area should be excluded from the WUI hazard area. **Figure 6** presents a wildfire risk map showing the WUI in BSB County used for the PDM analysis.

To complete the vulnerability analysis for this project, GIS was used to intersect the very high and high zones from 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 4.3-4**. Building exposure reflects only the monetary structure value and does not account for improvements or personal effects that may be lost to wildfire.

Table 4.3-4. Butte-Silver Bow Co. Vulnerability Analysis; Wildfire (High and Very High WUI)

Category	Butte-Silver Bow County Total	Walkerville, Town
Residential Property Exposure \$	\$244,987,311	\$10,507,778
# Residences At Risk	1,399	117
Commercial, Industrial & Agricultural Property Exposure \$	\$82,592,669	\$1,266,984
# Commercial, Industrial & Agricultural Properties At Risk	595	80
Critical Facilities Exposure Risk \$	\$141,315,692	\$7,532,828
# Critical Facilities At Risk	22	2
Bridge Exposure \$	\$4,604,287	0
# Bridges At Risk	13	0
Persons At Risk	6,533	450
Persons Under 18 At Risk	1,468	93

Section 4: Risk Assessment and Vulnerability Analysis

GIS analysis of the wildfire risk to BSB County indicates that approximately 27,952 acres (6.1 percent) are within very high and high risk WUI areas. According to the vulnerability analysis, 1,399 residences, 595 commercial, industrial and agricultural buildings, and 22 critical facilities are located in the high and very high risk WUI areas. The Wildfire Section in **Appendix C** lists the critical facilities and bridges within the high and very high risk WUI areas.

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

Future Development

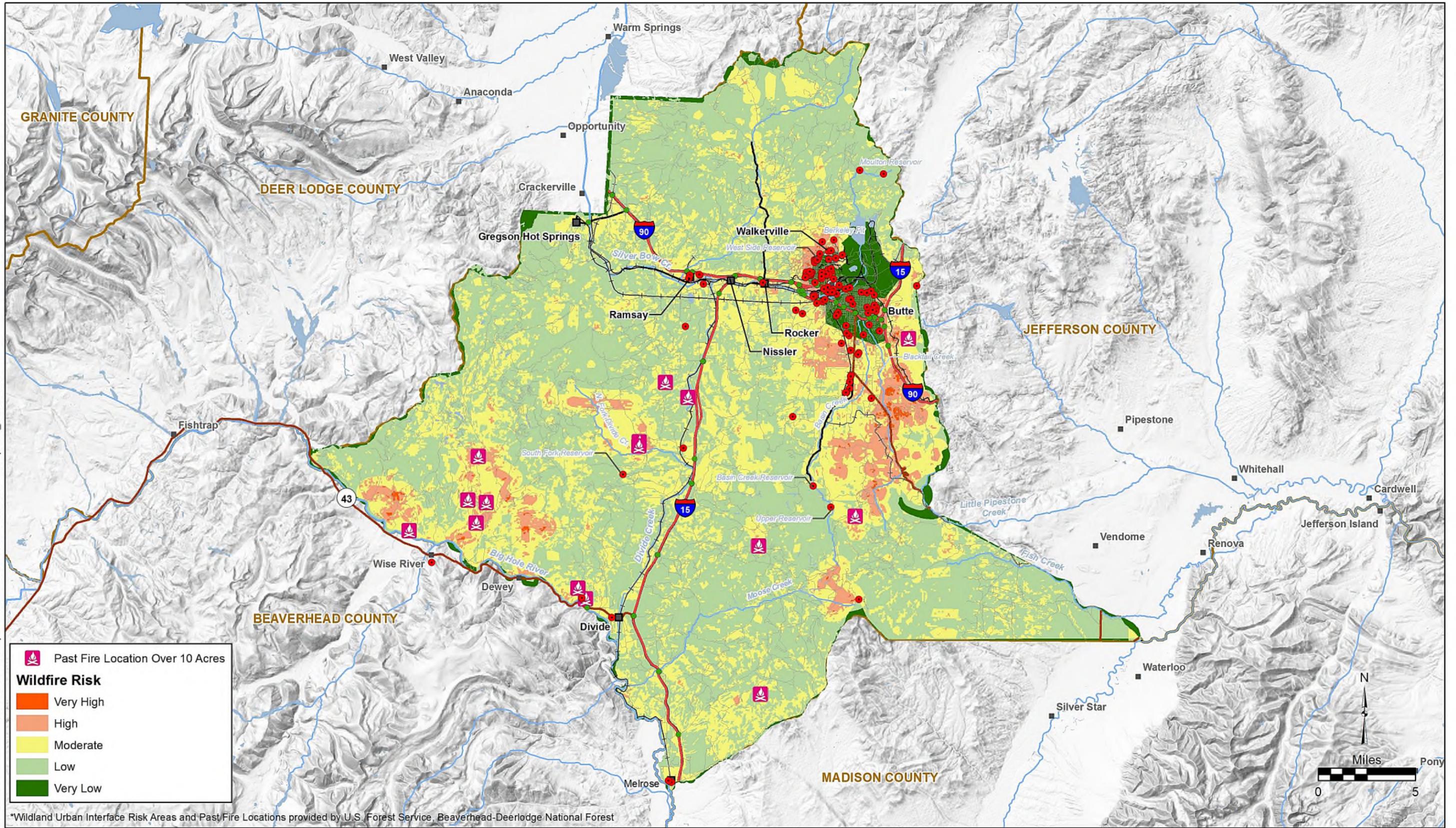
Wildfire disasters can be mitigated through comprehensive land use planning that includes housing development design, fuels management, and public education. Regulations and ordinances addressing these issues in future development can play a significant role to minimize the danger posed by fire to residents,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

One of the goals in the 2008 BSB Growth Policy was to address deficiencies within land use regulations with respect to the reduction of wildfire in the WUI including adequate access to subdivisions in rural areas. Implementation strategies to achieve this objective include: developing and maintaining an inventory of areas where wildfire risks are present; and, updating the BSB Subdivision Ordinance to reduce the incidence of wildland fire addressing defensible space and access for emergency vehicles.

In 2009, the Butte-Silver Bow Subdivision Regulations were revised and now present requirements for subdivisions located in areas of high fire risk. Appendix A (Fire Protection) addresses specific wildfire protection standards which require all subdivisions be planned, designed, constructed, and maintained so as to minimize the risk of fire and to permit the effective and efficient suppression of fires in order to protect persons, property, and forested areas, including:

- Development of a Fire Protection Plan prior to plat application.
- At least two routes of egress-ingress.
- Road rights-of-way clear of slash.
- Bridges built to a design load of 20 tons and constructed of non-flammable materials.
- Building sites not located on slopes greater than 25 percent or at the apex of “fire chimneys”.
- Fire protection water supply requirements.
- Forest density (thinning) standards.
- Green belt creation.
- Sufficient supply and volumes of water for consumption and firefighting purposes.
- Roof covering requirements; only Class A or B fire-rated roofing materials and no wood shakes.
- Gas storage tanks located at least 20 feet from residential structures.
- Fire protection covenants.

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*Wildland Urban Interface Risk Areas and Past Fire Locations provided by U.S. Forest Service, Beaverhead-Deerlodge National Forest



Legend

- Critical Facility
- ⊙ County Seat
- △ Incorporated Place
- Place Name
- Bridge
- Interstate
- Primary Route
- Secondary Route
- Other Route
- Railroad
- Lake/Reservoir
- River/Stream
- County

April 2016

Figure 6

**Wildfire Hazard Area
Butte-Silver Bow County
Pre-Disaster Mitigation Plan**

4.4 Earthquake

CPRI SCORE = 2.95

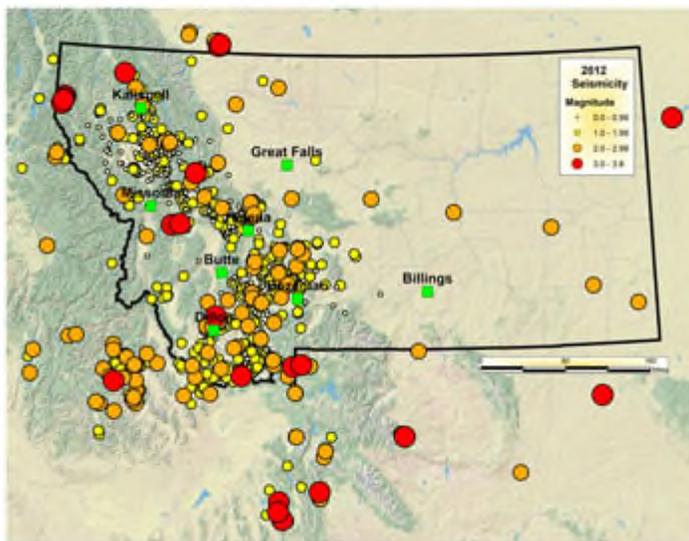
Description and History

An earthquake is ground shaking and radiated seismic energy caused most commonly by a sudden slip on a fault, volcanic or magmatic activity, or other sudden stress changes in the earth. An earthquake of magnitude 8 or larger on the Richter Scale is termed a great earthquake. Montana has not experienced a great earthquake in recorded history. A major earthquake (magnitude 7.0-7.9) occurred near Hebgen Lake (Gallatin County) in 1959 and dozens of active faults have generated magnitude 6.5-7.5 earthquakes during recent geologic time.

The earthquake hazard is defined as any physical phenomenon associated with an earthquake that may produce adverse effects on human activities. This includes surface faulting, ground shaking, landslides, liquefaction, tectonic deformation, tsunami, and seiche and their effects on land use, manmade structures, and socioeconomic systems. Populations have little or no warning prior to an earthquake, so the impact to that population could be considered high with little time to take protective actions.

Earthquakes are measured by two variables, magnitude and intensity. The magnitude of an earthquake, as measured on the Richter scale, reflects the energy release of an earthquake. The intensity of an earthquake is gauged by the perceptions and reactions of observers as well as the types and amount of damage. The intensity of an earthquake is rated by the Modified Mercalli Scale. This scale ranks the intensity from I to XII. An earthquake rated as a I, would not be felt except by very few people under especially favorable circumstances. An intensity rating of XII on the other hand would result in total destruction. Damage is predicted to be slight in buildings designed especially for the seismic zone. Buildings not constructed to meet the standards for the seismic zone would experience considerable damage with partial collapse. BSB County is generally rated as having an intensity level of VIII.

Montana ranks fifth in the nation in terms of number of historic earthquakes greater than magnitude



6. A map from the Montana Bureau of Mines and Geology website shows the location and magnitude of earthquakes in Montana. BSB County lies along the western edge of what is called the Intermountain Seismic Belt. This belt of seismicity extends from western Montana south to southern Nevada. Earthquake density within the Intermountain Seismic Belt is anomalous within North America, and eight of the 16 largest historic earthquakes in the belt occurred in Montana (Stickney, 2007).

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On November 4, 1897, an earthquake with an estimated magnitude of as 5.6 occurred east of Dillon and shook Butte with an intensity of 6. This earthquake is estimated to have been felt for about 193,000 square miles surrounding the epicenter. Then, on April 19, 1910, a magnitude 5.4 earthquake struck near Butte again. This earthquake was estimated to have been felt for about 27,000 square miles. The 7.5 magnitude Hebgen Lake earthquake in 1959 caused \$75,000 - \$100,000 in damages to the Franklin School according to historical newspaper records. A smaller 5.25 magnitude earthquake 90 miles southeast of Butte on January 5, 1965 knocked over dishes and Christmas trees, but did not result in any injuries or substantial damages.

More recently, the October 28, 1983 magnitude 7.3 Borah Peak, Idaho earthquake produced intensity V shaking in Butte. It was followed by four aftershocks of magnitude 5.5 or greater. Borah Peak is 140 miles from Butte. The June 7, 1994 5.0 magnitude earthquake centered near Challis, Idaho was also felt in BSB County.

Table 4.4-1 presents the historic earthquakes which have occurred in Montana and surrounding region since 1900 with a magnitude of 5.5 or greater. Although one significant earthquake occurred in eastern Montana in 1909, the majority have occurred along the Intermountain Seismic Belt and Centennial Tectonic Belt in western Montana.

Table 4.4-1. Historic Earthquakes of Montana and Surrounding Regions with Magnitudes of 5.5 or Greater Since 1900

Date	Magnitude	Approximate Location	Date	Magnitude	Approximate Location
05/16/1909	5.5	Northeast Montana	08/18/1959	6.0	Hebgen Lake
06/28/1925	6.6	Clarkston Valley, MT	08/18/1959	5.6	Hebgen Lake
02/16/1929	5.6	Clarkston Valley, MT	08/18/1959	6.3	Hebgen Lake
10/12/1935	5.9	Helena	08/19/1959	6.0	Hebgen Lake
10/19/1935	6.3	Helena	10/21/1964	5.6	Hebgen Lake
10/31/1935	6.0	Helena	06/30/1975	5.9	Yellowstone Park
07/12/1944	6.1	Central Idaho	12/08/1976	5.5	Yellowstone Park
02/14/1945	6.0	Central Idaho	10/28/1983	7.3	Challis, ID
09/23/1945	5.5	Flathead Valley	10/29/1983	5.5	Challis, ID
11/23/1947	6.1	Virginia City	10/29/1983	5.5	Challis, ID
04/01/1952	5.7	Swan Range	08/22/1984	5.6	Challis, ID
08/18/1959	7.5	Hebgen Lake	07/26/2005	5.6	Beaverhead County
08/18/1959	6.5	Hebgen Lake			

Source: Stickney and others, 2000

History has shown that significant earthquakes (up to magnitude 6.5) may occur anywhere throughout the Intermountain Seismic Belt, even in areas where young faults are not recognized. Examples of damaging earthquakes for which no known surface fault was recognized include the 1925 Clarkston earthquake (magnitude 6.6) and the 1935 Helena earthquakes (magnitude 6.3-5.9). **Figure 7** presents the main faults in BSB County. Two potentially active faults, the Continental Fault and the Rocker Fault, are further described below.

The Continental Fault is one of a linked set of faults forming a zone that is more than 1.9 miles wide and as much as 33.5 miles long extending along the eastern side of the Summit Valley (the valley in which Butte is built). Both Interstates-15 and -90 cross the Continental Fault a few miles west of the

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Continental Divide. The Continental Fault is exposed in the East Continental open-pit copper mine and also underlies the east abutment of the Yankee Doodle Tailings Dam. The Continental Fault proper has had over 3,500 feet of offset and has very likely moved in the past 1.8 million years. The Rocker Fault is segmented and has a cumulative length of more than 30 miles extending from north of Rocker to southeast of Divide. Segments of the Rocker Fault have moved within the past 1.8 million years. Both the Rocker Fault and the Continental Fault set have been offset by small motions on northeast-trending faults that may be acting as transfer faults to accommodate motion on the larger faults. Existing east-west extensional stresses in the crust are capable of causing seismicity near Butte, and may cause movement on the Continental and Rocker Faults (Elliott and McDonald, 2009).

Vulnerability and Area of Impact

Many of BSB County's critical facilities have not been seismically assessed. The loss figures in **Tables 4.4-3 and 4.4-3**, below suggest that much damage could result from a seismic event. According to 2000 census data, over 86 percent of residences were constructed prior to 1979 and over 40 percent of residences were constructed prior to 1939. Many of the existing homes, businesses, and critical facilities may not be structured to withstand seismic shaking.

A seismic evaluation was done on the Yankee Doodle Tailings Dam in April 1993, and the dam was found to be seismically safe when modeled under maximum credible earthquake conditions (Harding Lawson Associates, 1993). The Emergency Action Plan (EAP) for the Yankee Doodle Tailing Dam was updated by Montana Resources LLP in 2015. See *Plan Section 4.9* for additional information on this dam.

The Butte Flats may be susceptible to liquefaction during an earthquake. Conditions needed to create a liquefaction hazard include partially consolidated sediments (alluvial deposits that contain sand and silt) that are saturated with groundwater. The US Geological Survey (USGS) defines liquefaction as "loss of strength of loosely-packed, waterlogged sediments in response to strong ground shaking; a cause for major damage during earthquakes."

Mike Stickney, the director of Earthquake Studies at the MBMG is a member of the PDM Steering Committee and provided insight on the earthquake risk in BSB County in response to questions from the public. He thought that the uptown area was only slightly less vulnerable to earthquake damage being built on bedrock. The Flats area may be subject to liquefaction to a limited degree but no mapping has been done. Regarding the Berkley Pit, if there was an earthquake, sloughing of the pit walls could produce waves but the waves would not be near the top edge of the pit and wouldn't overflow.

Probability and Hazard Magnitude

Earthquake damages can be hard to predict and assess without detailed structure information or a damage model. The FEMA HAZUS-MH earthquake loss estimation methodology was used in the 2010 BSB Hazard Mitigation Plan to model the effect an earthquake would have on BSB critical facilities. HAZUS-MH is a software program that uses mathematical formulas and information about building stock, local geology and the location and size of potential earthquakes, economic data, and other information to estimate losses from a potential earthquake.

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The model earthquake used for analysis was a magnitude 6.5, shallow, crustal, extensional earthquake centered along the Continental Fault. This earthquake scenario was selected based on consultation with the MBMG (Stickney, personal communication, 2010). A “Level Two” HAZUS analysis was conducted that required input of specific information about building characteristics. Results of the Level 2 critical facility analysis showing buildings which would sustain over \$1 million in damage and those which would sustain greater than 40 percent damage are summarized in **Tables 4.4-2 and 4.4-3**, respectively.

Table 4.4-2. Highest Dollar Loss Buildings (Over \$1 Million) – Butte Silver Bow County Critical Facility Analysis

Facility	Address	Economic Loss	% Loss
BSB Courthouse	155 W. Granite, Butte	\$12,462,600	47.80%
Montana Tech, College of Technology	25 Basin Creek Rd.,	\$6,227,400	30.93%
Butte High School	401 S. Wyoming, Butte	\$5,642,660	55.91%
East Middle School	2600 Grand Ave., Butte	\$4,818,600	53.43%
Montana Tech, Chemistry - Biology Building	1300 W. Park Street,	\$4,589,560	37.71%
Montana Tech, Main Hall	1300 W. Park Street,	\$3,783,380	36.08%
Montana Tech, Museum Building	1300 W. Park Street,	\$3,660,520	45.57%
Montana Tech, Science & Engineering Building	1300 W. Park Street,	\$3,091,410	36.72%
BSB Civic Center	1340 Harrison Ave.,	\$2,760,000	43.78%
BSB Law Enforcement Agency & 911 Center	225 N. Alaska, Butte	\$2,628,130	51.34%
St. James Healthcare Hospital	400 S. Clark St., Butte	\$2,578,860	37.21%
Montana Tech, Prospector Hall (Residence Hall)	1300 W. Park Street,	\$2,576,330	41.35%
Montana Tech, Library Building & Auditorium Building	1300 W. Park Street,	\$2,196,800	24.25%
BSB Archives	17 W. Quartz, Butte	\$2,007,950	55.59%
Central Elementary School & Central Junior High	1100 Delaware, Butte	\$1,879,910	56.44%
Moulton Water Treatment Plant	2297 North Main St.,	\$1,756,170	28.17%
Montana Tech, Engineering Laboratory-Classroom Building	1300 W. Park Street,	\$1,723,150	11.28%
Montana Tech, Mill Building	1300 W. Park Street,	\$1,643,140	45.43%
West Elementary School	800 S. Emmett, Butte	\$1,612,060	36.02%
County Detention Center	155 W Quartz St, Butte	\$1,605,930	15.64%
Whittier Elementary School	2500 Sherman, Butte	\$1,558,450	49.97%
Montana Tech, Health, Physical Education, & Recreation	1300 W. Park Street,	\$1,542,970	12.94%
Big Hole Water Treatment Facility (Feely)	847 Divide Creek Rd.,	\$1,542,560	7.87%
Hillcrest Elementary School	3000 Continental Dr.,	\$1,481,700	55.56%
Emerson Elementary School	1924 Phillis Ave., Butte	\$1,461,590	48.63%
Bert Mooney Airport Out Building	101 Airport Rd., Butte	\$1,431,870	37.68%
Montana Tech, Centennial Hall (Residence Hall)	1225 Broadway, Butte	\$1,425,930	31.05%
Montana Tech, Petroleum Building	1300 W. Park Street,	\$1,348,930	29.42%
Butte Career Center - Webster Garfield School	1050 S. Montana, Butte	\$1,317,350	40.72%
Montana Tech, Engineering Hall	1300 W. Park Street,	\$1,313,770	36.45%
Montana Tech, Mining Geology Building	1300 W. Park Street,	\$1,306,470	15.22%
Butte Central High School	9 S. Idaho, Butte	\$1,247,170	58.66%
Montana Tech, Student Union Building	1300 W. Park Street,	\$1,117,510	12.33%

Source: HAZUS-MH, 2010; Scenario: 6.5 Magnitude Shallow Crustal Extensional Earthquake on Continental Fault

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Table 4.4-3. Most Vulnerable Buildings (Over 40% Loss) – Butte Silver Bow County

Facility	Address	Economic Loss	% Loss
Butte Central High School	9 S. Idaho, Butte	\$1,247,170	58.66%
Central Elementary School & Central Junior High	1100 Delaware, Butte	\$1,879,910	56.44%
Butte High School	401 S. Wyoming, Butte	\$5,642,660	55.91%
BSB Archives	17 W. Quartz, Butte	\$2,007,950	55.59%
Hillcrest Elementary School	3000 Continental Dr.,	\$1,481,700	55.56%
East Middle School	2600 Grand Ave., Butte	\$4,818,600	53.43%
BSB Law Enforcement Agency & 911 Center	225 N. Alaska, Butte	\$2,628,130	51.34%
Walkerville Town Hall	40 W. Daly, Walkerville	\$221,924	50.44%
Butte Water Utility Division/ Public Works Building	124 W. Granite, Butte	\$647,011	50.22%
Whittier Elementary School	2500 Sherman, Butte	\$1,558,450	49.97%
Belmont Senior Center	315 E. Mercury, Butte	\$624,982	48.69%
Emerson Elementary School	1924 Phillis Ave., Butte	\$1,461,590	48.63%
South Fire Station	1901 Harrison, Butte	\$272,680	48.24%
BSB Courthouse	155 W. Granite, Butte	\$12,462,600	47.80%
Water Dispatch Building	129 W Granite, Butte	\$181,825	47.22%
Margaret Leary Elementary School	1301 Four Mile Vue Rd.	\$856,392	46.49%
Montana Tech, Chancellor's Residence-H	1315 W. Park, Butte	\$443,306	46.03%
MT Tech, Offices - South Building - H.I.R.L. Program	71 Melanie Lane, Butte	\$54,527	45.94%
MT Tech, Museum Building	1300 W. Park Street,	\$3,660,520	45.57%
MT Tech, Mill Building	1300 W. Park Street,	\$1,643,140	45.43%
Head Start Program - Monroe School	1000 S. Arizona, Butte	\$645,386	44.81%
MT Tech, Mineral Research Ctr Office & Lab Building	106 S. Parkmont, Butte	\$331,823	44.67%
BSB Civic Center	1340 Harrison Ave.,	\$2,760,000	43.78%
MT Tech, Mineral Research Center - Pilot Plant II	106 S. Parkmont, Butte	\$80,259	43.27%
MT Tech, Mineral Research Center - Pilot Plant I	106 S. Parkmont, Butte	\$75,209	41.58%
MT Tech, Prospector Hall (Residence Hall)	1300 W. Park Street,	\$2,576,330	41.35%
Dept. Military Affairs, Butte Readiness Center Hazardous	600 Gilman, Butte	\$1,842	40.84%
Butte Career Center - Webster Garfield School	1050 S. Montana, Butte	\$1,317,350	40.72%
BSB Health Offices	25 W. Front St., Butte	\$497,846	40.61%

Source: HAZUS-MH, 2010; Scenario: 6.5 Magnitude Shallow Crustal Extensional Earthquake on Continental Fault

Another HAZUS analysis was completed in 2014 by FEMA whereby the epicenter of the earthquake scenario was the Continental Fault in BSB County and a magnitude 6.7 earthquake. The results for BSB and the adjoining counties indicate there would be 8-42 casualties depending on the time of day. Economic costs would be \$1.26 billion including \$833 million in building-related losses, \$16 million in transportation system losses, \$415 million in utility system losses (FEMA, 2014).

The USGS National Seismic Hazard Mapping Project has created peak ground acceleration maps that show the strength of seismic shaking with a 10 percent probability of being exceeded in a 50 year period. The strength of the shaking is measured as a percent of the acceleration of gravity (%g). **Figure 7** shows peak ground acceleration maps for BSB County which indicate the intensity of shaking from a seismic event increases from west to east across the county. The majority of urban Butte is in the 18-20%g band of seismicity while areas to the east are in the 20-30%g band. According to Qamar (2008), at 9.2%g the earthquake is felt by all with many frightened. Some heavy furniture is moved with a few instances of fallen plaster. Damage is considered slight. At 18%g, damage is negligible in buildings of good design and construction, slight to moderate in well-built ordinary structures, and considerable in poorly-built or badly designed structures. Some chimneys may be broken, and the shaking is noticed by people driving cars. At 34%g, damage is slight in specially

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designed structures, considerable in ordinary substantial buildings with partial collapse, and great in poorly built structures. Chimneys and walls may fall and heavy furniture is overturned.

To complete the earthquake vulnerability analysis for the 2016 PDM Plan, GIS was used to intersect the USGS peak ground acceleration maps 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 4.4-4**.

Table 4.4-4. Butte-Silver Bow County Vulnerability Analysis; Earthquake (>20%g)

Category	Butte-Silver Bow County	Walkerville, Town
Residential Property Exposure \$	\$647,330,256	0
# Residences At Risk	3,600	0
Commercial, Industrial & Agricultural Property Exposure \$	\$187,019,599	0
# Commercial, Industrial & Agricultural Properties At Risk	834	0
Critical Facilities Exposure Risk \$	\$42,341,422	0
# Critical Facilities At Risk	35	0
Bridge Exposure \$	\$3,161,364	0
# Bridges At Risk	13	0
Persons At Risk	9,786	0
Persons Under 18 At Risk	2,118	0

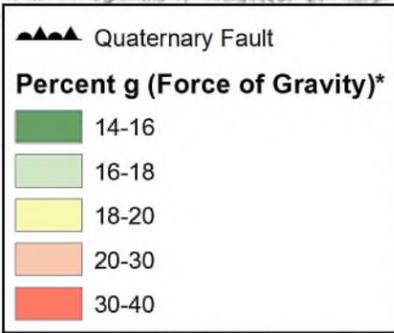
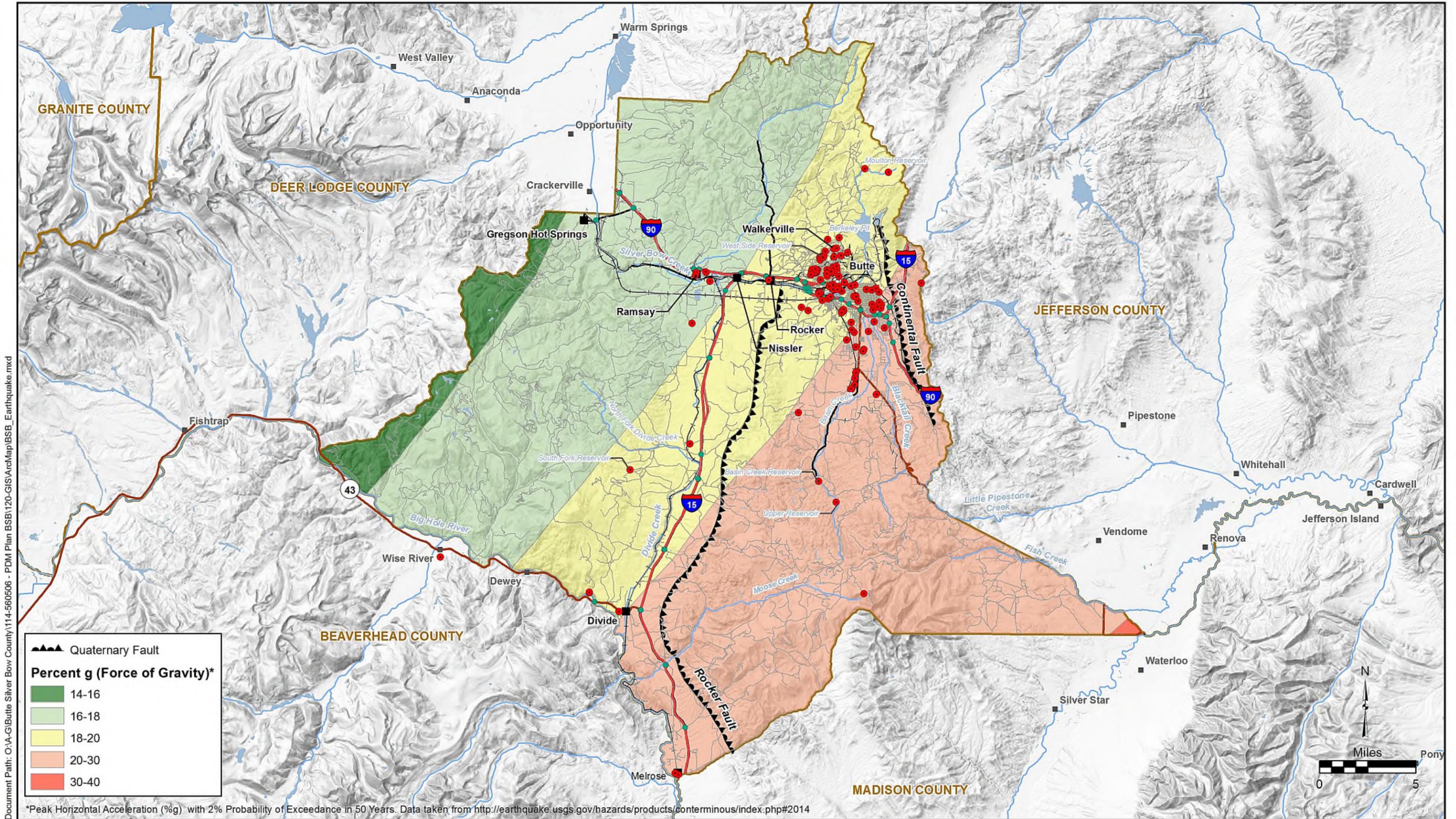
GIS analysis of the earthquake risk to BSB County (including Walkerville) indicates that 169,936 acres (36.9 percent) are located within the shaking zone (peak horizontal acceleration) over 20% g. According to the vulnerability analysis, 3,600 residences, 834 commercial, industrial and agricultural buildings 35 critical facilities are located in the >20% g zone. The *Earthquake Section* in **Appendix C** presents supporting documentation from the risk assessment including a list of critical facilities and bridges in the various seismic zones.

According to Elliott and McDonald (2009), the oldest faults in BSB County do not present an earthquake hazard. Some younger faults can be inferred to have produced earthquakes larger than magnitude 6.5 within the past 1.8 million years, and may generate earthquakes in the future. Not all potential sources of earthquakes can be identified since moderate-sized earthquakes in southwest Montana typically originate on faults that are not recognized at the surface. Although BSB County is rated as having a high seismic risk; the probability of future earthquakes causing significant damage is rated as “infrequent” (less than 1 event every 10 years). The PDM Steering Committee rated the earthquake probability as “likely”.

The greatest activity on the Intermountain Seismic Belt passes to the east of BSB County and it is most likely that future earthquakes that affect BSB will be centered at some distance away within the most seismically active region. Most of the county has seismic risk based on the peak ground acceleration probabilities. Based on this, all of the critical facilities and vulnerable populations are considered to have a high probability for seismic shaking. As demonstrated by the HAZUS-MH run, significant structural damages to several facilities could be expected.

Future Development

The 1991 Uniform Building Code (UBC), a nationwide industry standard, sets construction standard for different seismic zones in the nation. The UBC ranks seismic zones in the United States on a scale of 1 (low) to 4 (extreme). BSB County has adopted the UBC in their building codes and these are enforced through the building permit system.



Legend

- Critical Facility
- △ Incorporated Place
- Bridge
- Secondary Route
- ☉ County Seat
- Place Name
- Interstate
- Other Route
- Primary Route
- Railroad
- ☪ Lake/Reservoir
- River/Stream
- County



April 2016

Figure 7

**Earthquake Hazard Area
Butte-Silver Bow County
Pre-Disaster Mitigation Plan**

4.5 Severe Weather and Drought

CPRI SCORES
 SEVERE SUMMER WEATHER = 3.1
 SEVERE WINTER WEATHER = 3.0
 DROUGHT = 2.2

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 BSB 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 a consequence of severe weather. Further details on these severe weather hazards are profiled below.

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 4.5-1**.

Table 4.5-1. Warning and Advisory Criteria for Severe Winter Weather

Winter Weather	Weather Advisory
Winter Storm Watch	Issued to give the public 12-48 hours of advance notice of the potential for snow 6 inches or more in 12 hours or 8 inches or more in 24 hours AND sustained or frequent wind gusts of 25 – 34 mph occasionally reducing visibilities to ¼ mile or less for three hours or more.
Winter Weather Advisory	Issued when a combination of winter weather elements that may cause significant inconveniences are occurring, imminent, or have a high probability of occurring.

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Table 4.5-1. Warning and Advisory Criteria for Severe Winter Weather

Winter Weather	Weather Advisory
Winter Storm Warning	Issued when snow 6 inches or more in 12 hours or 8 inches or more in 24 hours AND sustained or frequent wind gusts of 25-34 mph occasionally reducing visibilities to ¼ mile or less for three hours or more are occurring, imminent, or have a high probability of occurring.
Blizzard Watch	Issued to give the public 12-48 hours of advance notice of possible blizzard conditions (sustained winds or frequent gusts of 35 mph or greater and visibilities of less than a quarter mile from falling and/or blowing snow for 3 hours or more).
Blowing Snow Advisory	Issued for visibilities intermittently at or below ½ mile because of blowing snow.
Blizzard Warning	Issued when blizzard conditions (sustained winds or frequent gusts of 35mph or greater and visibilities of less than a quarter mile from falling and/or blowing snow for 3 hours or more) are occurring, imminent, or have a high probability of occurring.
Freezing Rain Advisory	Issued when an accumulation of ice will make roads and sidewalks slippery, but significant and damaging accumulations of ice are not expected.
Ice Storm Warning	Issued when a significant and damaging accumulation of ice is occurring, imminent or has a high probability of occurring.
Snow Advisory	Issued when snow accumulations of 2-5 inches in 12 hours are expected.
Sleet Advisory	Issued when sleet accumulations causing hazardous conditions are expected.
Heavy Snow Warning	Issued when snow accumulations of 6 inches or more in 12 hours or 8 inches or more in 24 hours are expected.
Wind Chill Watch	Issued to give the public 12-48 hours advanced notice of the potential for wind chills of -40°F or colder with a wind speed of 10 mph or higher and a duration of 6 hours or more.
Wind Chill Advisory	Issued when wind chills of -20°F to -39°F with a wind speed of 10 mph or higher and a duration of 6 hours or more are expected.
Wind Chill Warning	Issued when wind chills of -40°F or colder with a wind 10 mph wind in combination with precipitation.

Source: National Weather Service (NWS, 2015)

Snow storms and bitterly cold temperatures are common occurrences in BSB 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 4.5-2** presents the severe winter weather events in BSB County since 1996.

Table 4.5-2. Butte-Silver Bow County Severe Winter Weather Reports (~November-April)

Date	Event	Magnitude	Date	Event	Magnitude
1/3/1996	Winter Storm	-	10/12/2008	Winter Storm	-
1/4/1996	Winter Storm	-	12/13/2008	Cold/Wind Chill	-
1/24/1996	Winter Storm	-	12/29/2008	Winter Storm	-
1/28/1996	Winter Storm	-	1/7/2009	Winter Storm	-
2/2/1996	Cold/Wind Chill	-	1/24/2009	Extreme Cold/Wind	-
2/3/1996	High Wind	64 mph	2/25/2009	Winter Storm	-
2/9/1996	High Wind	100 mph	4/27/2009	Winter Storm	-
2/19/1996	High Wind	55 mph	12/5/2009	Extreme Cold/Wind	-
2/23/1996	High Wind	70 mph	1/5/2010	Winter Storm	-
3/1/1996	High Wind	70 mph	4/8/2010	High Wind	60 mph
4/24/1996	High Wind	100 mph	11/22/2010	Extreme Cold/Wind	-
4/26/1996	High Wind	102 mph	1/30/2011	Extreme Cold/Wind	-
10/26/1996	Blizzard	35 mph	2/12/2011	High Wind	59 mph
11/18/1996	Winter Storm	-	2/24/2011	Cold/Wind Chill	-
12/5/1996	High Wind	60 mph	12/29/2011	Strong Wind	49 mph



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Table 4.5-2. Butte-Silver Bow County Severe Winter Weather Reports (~November-April)

Date	Event	Magnitude	Date	Event	Magnitude
12/20/1996	Winter Storm	-	12/2/2012	Winter Weather	-
2/6/1999	Winter Storm	-	12/16/2012	Winter Storm	-
2/1/2000	High Wind	60 mph	1/10/2013	Winter Storm	-
12/14/2000	Winter Storm	-	4/29/2013	High Wind	58 mph
12/15/2000	Blizzard	-	9/25/2013	Winter Weather	-
2/15/2001	Blizzard	-	10/3/2013	Winter Weather	-
11/23/2002	Winter Storm	-	10/27/2013	Winter Weather	-
1/22/2003	Winter Storm	-	11/5/2013	Winter Weather	-
2/21/2003	Winter Storm	-	11/7/2013	Winter Weather	-
10/29/2003	High Wind	60 mph	11/15/2013	Winter Weather	-
11/11/2003	High Wind	64 mph	12/2/2013	Winter Storm	-
11/18/2003	High Wind	60 mph	12/3/2013	Extreme Cold/Wind	-
1/5/2004	Cold/Wind Chill	-	12/18/2013	Winter Weather	-
1/30/2004	High Wind	60 mph	1/3/2014	Winter Weather	-
4/15/2004	High Wind	59 mph	1/5/2014	Extreme Cold/Wind	-
4/18/2005	Winter Storm	-	1/8/2014	Winter Weather	-
12/1/2005	Winter Storm	-	1/11/2014	Winter Weather	-
12/4/2005	Winter Storm	-	1/13/2014	High Wind	75 mph
2/16/2006	Cold/Wind Chill	-	1/29/2014	Winter Storm	-
10/30/2006	Winter Storm	-	2/4/2014	Extreme Cold/Wind	-
11/6/2006	High Wind	58 mph	2/9/2014	Winter Weather	-
11/13/2006	High Wind	76 mph	2/11/2014	Winter Weather	-
11/27/2006	Winter Storm	-	2/18/2014	Winter Weather	-
12/15/2006	High Wind	86 mph	2/23/2014	Winter Storm	-
1/11/2007	Extreme Cold/Wind	-	2/24/2014	Winter Weather	-
2/15/2007	High Wind	110 mph	2/27/2014	Winter Storm	-
8/7/2007	High Wind	63 mph	3/1/2014	Extreme Cold/Wind	-
11/12/2007	High Wind	90 mph	3/10/2014	Winter Weather	-
1/19/2008	Winter Storm	-	9/10/2014	Winter Weather	-
1/20/2008	Cold/Wind Chill	-	10/15/2014	Strong Wind	49 mph
2/7/2008	Winter Storm	-	11/2/2014	Winter Weather	-
4/4/2008	Winter Storm	-	11/9/2014	Winter Storm	-
4/19/2008	Blizzard	-	11/11/2014	Extreme Cold/Wind	-
4/29/2008	Strong Wind	55 mph	1/5/2015	Winter Storm	-

Source: NCDC, 2016

BSB County has a history of long duration cold spells. In 1983, the temperatures remained below zero from December 19-25, with the 23rd recording a temperature of -52. Unofficial temperatures for the Butte area are shown in **Table 4.5-3**.

Table 4.5-3. Historic Cold Temperatures; Butte-Silver Bow County

Date	Temperature (degrees Fahrenheit)	Date	Temperature (degrees Fahrenheit)
2/9/1933	-52	1/7/1937	-48
2/8/1936	-51	12/23/1983	-52
2/15/1936	-60		

Source: BSB County Hazard Vulnerability Analysis, 1984



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The Butte–Anaconda Almanac that summarizes the major events in Butte’s history notes October 11, 1911 as a day when the Butte area received 18 inches of snow and lost telephone and telegraph services. Western Montana was estimated to have sustained \$150,000 in damages. The Almanac also notes May 29, 1927 as the “heaviest snowstorm in 19 years.” During this event, Butte received 22 inches of snow. The area experienced problems with electrical and telephone service from this storm.

The 1984 Hazard Vulnerability Analysis also recognizes May 18, 1938 and the 1980 season as particularly severe snowfall time periods. On June 3, 2001, a late season snow storm dropped a foot of snow over the Butte area resulting in numerous power outages due to the heavy snow load on foliage covered branches which downed power lines.

Severe Summer Weather

A severe thunderstorm is defined by the National Weather Service as a thunderstorm that produces wind gusts at or greater than 58 mph (50 knots), hail 1-inch or larger, and/or tornadoes. Thunderstorms can also produce intense downbursts, lightning, and microburst wind. Strong winds can occur outside of thunderstorms when the overall weather conditions are favorable. The PDM Steering Committee recalled that in 2012 a lightning took out 911 at the courthouse. Lightning is also the cause of many of the wildfires in the area.

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. Thunderstorms can produce deadly and damaging tornadoes. As of February 1, 2007, the NWS began using the Enhanced Fujita Scale for Tornado damage. Tornadoes are not common in BSB County but high winds occur frequently.

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 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 4.5-4**.

Table 4.5-4. Warning and Advisory Criteria for Severe Summer Weather

Summer Weather	Weather Advisory
Hazardous Weather Outlook	Hazardous weather outlooks alert the public to the possibility for severe weather in the area from one to seven days in advance.
Severe Thunderstorm Watch	Issued when conditions for severe thunderstorms appear favorable for an area over the next several hours. Watches are typically in effect for 4-6 hours.
Severe Thunderstorm Warning	Issued when Doppler radar indicates or the public reports a thunderstorm with wind gusts of 58 mph or greater and/or hail 1-inch or larger in diameter. The warning is usually valid for 30-60 minutes.

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Table 4.5-4. Warning and Advisory Criteria for Severe Summer Weather

Summer Weather	Weather Advisory
High Wind Watch	Issued when conditions are favorable for non-thunderstorm sustained winds of 40 mph or greater or gusts of 58 mph or greater for a period of one hour or more, but the timing, location, and/or magnitude are still uncertain.
High Wind Warning	Issued when non-thunderstorm sustained winds of 40 mph or greater or gusts of 58 mph or greater for a period of one hour or more are expected.
Tornado Watch	Issued when conditions for tornadoes appear especially favorable for an area over the next several hours. Watches are typically in effect for 4-6 hours.
Tornado Warning	Issued when Doppler radar indicates or the public reports a tornado. The warning is usually valid for 15-45 minutes.

Source: National Weather Service (NWS, 2015)

There have been no Presidential Disaster Declarations or State Disasters issued for the severe summer weather hazard in BSB County. However, since the 2010 BSB County PDM Plan was completed, numerous incidents of severe summer weather have affected the county. **Table 4.5-5** presents severe summer storm events from the NCDC database indicating the magnitude of these events.

Table 4.5-5. Butte-Silver Bow County Severe Summer Weather Reports (~May-October)

Date	Location	Event	Magnitude	Date	Location	Event	Magnitude
6/8/1958	BSB County	Hail	-	7/24/2000	Butte	Tstm Wind	58 mph
6/24/1974	BSB County	Tstm Wind	61 mph	8/4/2001	Butte – 5 mi NW	Hail	1.50 in.
7/8/1975	BSB County	Hail	1.00 in.	8/21/1995	Butte	Tstm Wind	62 mph
7/9/1975	BSB County	Hail	1.50 in.	9/7/1995	Butte	Hail	-
6/6/1976	BSB County	Hail	1.00 in.	5/22/1996	Butte	Tstm Wind	59 mph
7/8/1980	BSB County	Hail	1.25 in.	8/28/1996	Butte – 5 mi W	Hail	0.75 in.
8/24/1981	BSB County	Tstm Wind	75 mph	6/12/1997	Butte	Funnel	-
7/4/1982	BSB County	Tstm Wind	-	7/19/1997	Butte	Hail, Wind	1.00 in.
5/14/1984	BSB County	Tstm Wind	58 mph	10/31/199	Butte	Non-Tstm	54 mph
6/15/1987	BSB County	Tstm Wind	74 mph	6/21/2002	Butte	Hail	1.00 in.
6/18/1987	BSB County	Hail	1.50 in.	8/7/2002	Butte	Hail	0.88 in.
6/21/1988	BSB County	Tstm Wind	69 mph	5/20/2004	Butte	Hail	0.75 in.
6/25/1988	BSB County	Tstm Wind	69 mph	6/16/2005	Rocker	Hail	1.75 in.
5/10/1989	BSB County	Tstm Wind	75 mph	8/8/2005	Butte	Hail	0.88 in.
7/2/1990	BSB County	Tstm Wind	-	8/10/2005	Melrose	Hail	1.00 in.
8/8/1990	BSB County	Tstm Wind	-	5/10/2007	Butte	Hail	0.88 in.
6/19/1991	BSB County	Tstm Wind	-	7/4/2008	Ramsay	Hail	1.25 in.
8/12/1993	Butte	Lightning	-	8/31/2008	Divide	Hail	0.88 in.
6/11/1994	Butte	Tstm Wind	61 mph	8/6/2009	Rocker	Hail	2.50 in.
7/22/2000	Butte Airport	Tstm Wind	64 mph	8/6/2009	Bert Mooney	Hail	2.00 in.

Source: NCDC, 2016. Notes: Tstm = Thunderstorm

Several instances of severe summer weather in BSB County are described below:

May 15, 1883 - Six people were injured by an estimated F2 tornado which touched down in Butte-Silver Bow. Homes and other buildings were destroyed 8 miles south of Butte.

July 19, 1997 - A severe thunderstorm passed through BSB County. Microburst winds, estimated at 80-90 mph, blew 500-1,000 trees down five miles south of Butte. One inch hail was also reported along with street flooding. All repeater sites on Red Mountain were damaged from the storm,



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including Montana Power, 911, and Montana Highway Patrol. Alternate systems were in place by the next day, but the primary systems took a month to be fully repaired. The NWS, after a ground and aerial survey, concluded that a microburst, straight line winds from a severe thunderstorm, occurred over an approximate five-acre area. In and around the microburst, 40-45 acres of forested land over a five mile swath were damaged with some trees over 200 years old were blown over.

August 6, 2009 – A strong low pressure system and associated cold front moved into the Northern Rockies, creating a favorable environment for strong hail producing thunderstorms and heavy rain. Flash flooding was reported in the city of Butte with this event as up to an inch of precipitation occurred in 30 to 45 minutes. Hail up to the size of baseballs and strong winds nearing 70 mph were also observed. Cars and windows, roofs and siding of homes, and recreation vehicles were damaged from the large hail. Tree branches were striped and broken from the large hail. Extensive damage occurred on Green Acres and Continental Drive near Butte.



Hail from August 6, 2009 Storm Event.

Drought

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

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

Typically, droughts are not declared disasters in the same way as a Presidential Disaster Declaration; rather, they are declared 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. **Table 4.5-6** presents the NWS warnings and advisories that relate to drought.

Table 4.5-6. 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.

Historical information has been obtained from the State DES website and modified to reflect the conditions in BSB County. In the 1930's, the "Dust Bowl" drought affected the State of Montana, including BSB County. This nationwide drought produced erosion problems in the creation of dust storms throughout the State. Again in the mid 1950's, Montana had a period of reduced rainfall; however, BSB County did not suffer as severely as those counties in the eastern and central portions of the state.

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

Then in the 1970's, a seven month survey ending in May of 1977 estimated that over 250,000 acres of Montana farmland had been damaged by winds. Inadequate crop cover and excessive tillage practices had resulted in exaggerated soil damage due to low soil moisture. The State of Montana began taking protective measures to conserve water.

BSB County was severely affected by drought again in 1985 and received a federal drought disaster declaration. For a typical 2,500 acre Montana farm/ranch, the operator lost more than \$100,000 in equity over the course of that year. The state's agriculture industry lost nearly \$3 billion in equity.

BSB County had drought conditions from 2000 through 2007 and received several USDA Disaster Declarations since then. The State of Montana received a total of \$152.4 million in disaster assistance from the Farm Service Agency in 2004, 2005, and 2006. This history shows that the county experiences drought almost once every decade and the drought may last for several years. Since the BSB County PDM Plan was completed in 2010, severe drought conditions have not impacted the county.

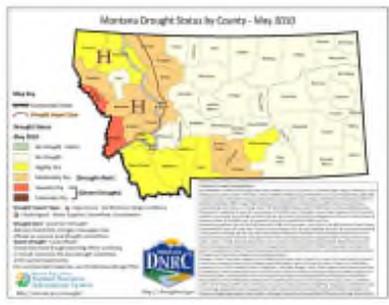
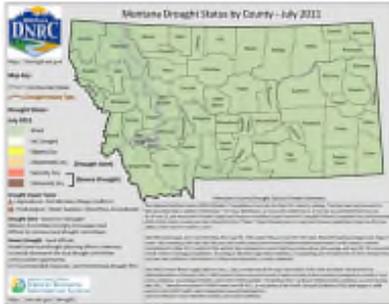
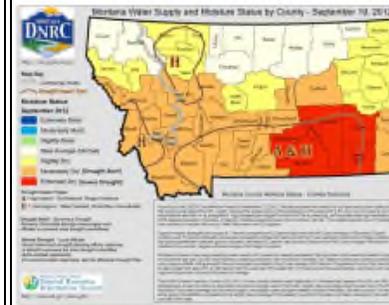
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Table 4.5-7 shows the Montana drought status for the period 2007-2015. Table 4.5-8 summarizes drought conditions in BSB County during this period.

Table 4.5-7. Montana Drought Status; 2007 - 2015		
2007 Montana County Drought Status		
May	July	September
2008 Montana County Drought Status		
May	July	September
2009 Montana County Drought Status		
May	July	September

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Table 4.5-7. Montana Drought Status; 2007 - 2015

2010 Montana County Drought Status		
May	July	September
		
2011 Montana County Drought Status		
May	July	September
		
2012 Montana County Drought Status		
May	July	September
		
2013 Montana County Drought Status		
May	May	May
		

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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

Table 4.5-9 and 4.5-10 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 4.5-9. Butte-Silver Bow County Severe Winter Weather Events with Damages

Date	Injuries	Fatalities	Property Damage	Crop Damage	Remarks
2/22/1962	0	0	\$75	\$0	High wind, snow, blowing snow,
2/1/1963	0.04	0	\$141	\$0	Freezing rain, high wind, snow
4/5/1964	0	0	\$32	\$0	Snow and drifting snow
5/3/1964	0	0.04	\$14,137	\$0	Snow and high wind
12/16/1964	0	0	\$66,962	\$0	High wind, blowing snow, severe
4/30/1967	0	1	\$0	\$0	Snowstorm
9/21/1968	0	0	\$2,406	\$24,056	Heavy snow, wind
1/31/1969	0	0	\$558	\$0	Cold and snow
3/3/1971	0	0	\$955	\$0	Wind, snow
4/20/1973	0	0	\$56,798	\$0	Blizzard
4/9/1975	0	0	\$45,875	\$0	Winter storm (severe blizzard)
10/16/1980	0	0	\$7,157	\$0	Snow
9/18/1983	0	0	\$6,278	\$628	Severe storm-snow
9/18/1988	0	0	\$50,221	\$0	Severe storm-snow
1/31/1989	0	0	\$28,916	\$290	Blizzard
2/1/1989	0	0	\$167,405	\$167	Severe cold
5/28/1989	0	0	\$3,817	\$0	Winter storm
10/28/1989	0	0	\$6,362	\$0	Heavy snow
4/28/1990	0	0	\$2,932	\$0	Winter storm
8/23/1992	0	0	\$366	\$36,606	Winter storm
8/25/1992	0	0	\$0	\$1,478	Frost/freeze
10/8/1993	0	0	\$8,179	\$0	Winter storm
2/24/1994	0	0	\$13,951	\$0	Winter storm
4/26/1994	0	0	\$6,627	\$0	Heavy snow, winter storm
11/17/1994	0	0	\$6,627	\$0	Heavy snow
3/27/1995	0	0	\$77,367	\$0	Winter storm
11/18/1996	0.09	0.18	\$0	\$0	Winter storm
2/15/2001	0.25	0.13	\$0	\$0	Winter storm
12/30/2004	0	0	\$17,825	\$0	Heavy snow
11/12/2007	2	0	\$817,332	\$0	High wind
4/29/2008	0	0	\$16,513	\$0	Strong wind



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Table 4.5-9. Butte-Silver Bow County Severe Winter Weather Events with Damages

Date	Injuries	Fatalities	Property Damage	Crop Damage	Remarks
6/11/2008	0	0	\$85	\$0	Heavy snow
4/8/2010	0	0	\$4,674	\$0	High wind
12/29/2011	0	0	\$632	\$0	Strong wind
1/2012	0.26	0.26	\$130	\$0	Avalanche
5/2012	0	0	\$0	\$521	Winter weather
10/16/2012	0	0	\$1,032	\$4,129	Strong wind
5/2013	0	0	\$513	\$0	Winter weather
9/2013	0	0	\$1,924	\$0	Winter weather
11/2013	0	0	\$513	\$0	Wind
11/7/2013	0	0	\$2,035	\$0	High wind
10/15/2014	0	0	\$1,001	\$0	Strong wind
11/2014	0	0	\$10,858	\$0	Winter weather
TOTAL	2.64	1.61	\$1,247,837	\$43,191	

Source: SHEL DUS, 2016 (adjusted to 2015 dollars), NCDC, 2016. 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 BSB 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. 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 4.5-10** presents severe summer weather events in BSB County with reported damages since 1960.

Table 4.5-10. Butte-Silver Bow County Severe Summer Weather Events with Damages

Date	Injuries	Fatalities	Property Damage	Crop Damage	Remarks
5/16/1960	0	0	\$4,089	\$0	Wind
6/9/1960	0	0	\$408	\$0	Thunderstorm and Heavy Rain
7/29/1960	0	0	\$408	\$0	Tornado
8/15/1960	0	0	\$408	\$0	Thunderstorm
9/4/1960	0	0	\$0	\$20,447	Severe Thunderstorms and High



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Table 4.5-10. Butte-Silver Bow County Severe Summer Weather Events with Damages

Date	Injuries	Fatalities	Property Damage	Crop Damage	Remarks
2/25/1961	0	0	\$870	\$870	High Wind
3/1/1961	0.04	0	\$1,704	\$0	High Wind
5/10/1961	0	0	\$1,704	\$0	High Winds and Thunderstorms
5/30/1961	0	0	\$870	\$8,700	Thunder, Heavy Rain, and Hail
6/29/1961	0	0	\$870	\$8,700	Thunder, High Wind, Hail, Heavy
12/21/1961	0.07	0	\$97	\$0	High Wind and Thunderstorms
5/3/1964	0	0.04	\$14,137	\$0	Snow and High Wind
6/6/1964	0	1.2	\$0	\$0	Heavy Rain
7/2/1964	0	0	\$0	\$1,590	Hail, Thunderstorms
6/6/1967	0	0	\$357,816	\$0	Hail
6/21/1967	0	0	\$357,816	\$0	Heavy Rain
7/19/1968	0	0	\$1,162	\$0	High Wind, Thunderstorms
9/19/1968	0	0	\$2,406	\$24,056	Wind
6/27/1970	0	0	\$64,112	\$64,112	Strong Winds, Hail
9/12/1973	0	0	\$18	\$0	Wind Storm
7/26/1974	0	0	\$795	\$0	High Winds
7/8/1975	0	0	\$2,202	\$0	Hail
7/9/1975	0	0	\$22,020	\$0	Hail
8/7/1975	0	0	\$459	\$4,588	Hail and Wind
8/24/1981	0	0	\$130,117	\$0	Wind
9/18/1983	0	0	\$6,278	\$628	Severe Storm
6/20/1985	0.02	0	\$2,561	\$2,561	Hail/Wind
9/17/1988	0	0	\$50,221	\$0	Severe Storm
10/16/1991	0	0	\$177,030	\$0	Wind
6/16/2005	0	0	\$6,091	\$0	Hail
4/29/2008	0	0	\$4,129	\$0	Strong Wind
10/2012	0	0	\$260	\$1,041	Wind
8/2013	0	0	\$2,823	\$0	Severe Storm/Thunderstorm
10/2014	0	0	\$253	\$0	Wind
TOTAL	0.13	1.24	\$1,214,133	\$137,292	

Source: SHEL DUS, 2016 (adjusted to 2015 dollars); NCDC, 2016

Annual loss was computed for the severe summer and winter weather hazard in BSB County using SHEL DUS data and the formula: Frequency x Magnitude x Exposure = Annual Loss, as further explained in *Section 4.1.6*. **Table 4.5-11** presents the results of the calculations.

Table 4.5-11. Butte-Silver Bow County Severe Weather Annual Loss

No. of Events	Period of Record (Yrs)	Frequency	Damage	Magnitude	Exposure	Annual Loss
Severe Summer Weather						
33	56	0.589	\$1,351,425	0.00145765%	\$2,849,052,333	\$24,461
Severe Winter Weather						
43	54	0.796	\$1,291,028	0.00106866%	\$2,849,052,333	\$24,236



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The National Drought Mitigation Center tracks indemnity payments for losses suffered due to drought on a county basis. For the 25 year period (1989 to 2014), BSB County has not received insurance payments for drought.

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 much greater duration than any in the 20th century have occurred in parts of North America as recently as 500 years ago." Based on this research, the 1950's drought situation could be expected approximately once every 50 years or a 20 percent chance every 10 years. An extreme drought, worse than the 1930's "Dust Bowl" has an approximate probability of occurring once every 500 years or a 2 percent chance of occurring each decade (NOAA, 2004).

Severe weather occurs in BSB 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 BSB County are ranked as "likely", occurring more than once every 10 years but not every year.

Future Development

The State of Montana has adopted the 2009 International Building Codes (IBC) and these codes are recognized by BSB County 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. The BSB County building department ensures the State of Montana building codes are followed.

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.

Drought conditions in recent years have severely reduced the available surface water in the area. In addition, growing pine beetle infestations have made pine trees more susceptible to fire, endangering entire watersheds and surface water quality. Given these threats to the water supply, BSB County is considering supplanting surface water with subsurface resources which could be used to address drinking water needs as well as fire suppression (BSB Growth Policy, 2008).

4.6 Transportation Accidents

CPRI SCORES:
 AIRCRAFT ACCIDENTS = 2.95
 HIGHWAY ACCIDENTS = 3.2
 RAILROAD ACCIDENTS = 2.7

Description and History

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. This hazard profile covers highway accidents, railroad accidents, and aircraft accidents. *Plan Section 4.3* presents the hazard profile for Hazardous Material Incidents.

BSB County has two interstation highways; Interstate-90 (I-90) and Interstate-15 (I-15). I-90 is a portion of the east-west transcontinental interstate, which links Seattle, WA to Boston, MA. The portion in Montana is 554.10 miles long, linking 14 counties through central and southern Montana. Fairmont Hot Springs is the first exit in BSB County on I-90, as the highway starts to turn back towards the east. Ramsey is located in the southwest corner of the interchange where I-15 becomes concurrent with I-90 through Butte. On the western edge of Butte, I-115 continues east into town, as I-15/90 turns southeast, bypassing most of downtown Butte. The Harrison Avenue interchange serves the Bert Mooney Airport before I-15/90 split just east of Butte, with I-15 continuing north over the Continental Divide at the Elk Park Pass. I-90 heads south then east passing over the divide at Homestake Pass. The entire route was improved to interstate standards during the 1960s, and was improved in 2005.

Statistics on highway accidents in BSB County over the past 10 years were provided by MDT, and are presented in **Table 4.6-1**. Information is not available on whether these incidents involved a hazardous material response. There is no history of a mass casualty accident in BSB County involving a school bus or tour bus; however, school events use bus transport during winter months when severe weather can pose an extreme risk.

Table 4.6-1. Butte-Silver Bow County Highway Accidents; 2004 - 2014

Year	Number of Accidents	Fatalities	Injuries	Year	Number of Accidents	Fatalities	Injuries
2004	675	6	151	2010	589	2	124
2005	705	6	134	2011	579	2	130
2006	749	6	147	2012	510	2	132
2007	660	3	142	2013	610	7	110
2008	717	5	158	2014	704	6	136
2009	655	7	135	TOTAL	7,153	52	1,499

Source: MDT, 2015

There are several railroad lines that pass through the BSB County. Burlington Northern Santa Fe (BNSF) serves as a freight carrier connecting Butte to the Port of Montana. This BNSF line continues to Railway Company runs a short line operation between Butte and Anaconda. Union Pacific Railroad connects the Port of Montana to Pocatello, Idaho.

Table 4.6-2 lists railroad accidents in BSB County with details on which of those involved hazardous materials. **Table 4.6-3** presents accidents at railroad crossings in the county. According to the National Transportation Safety Board (NTSB), 60 percent of all railroad accidents occur at unprotected or passive crossings.

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Table 4.6-2. Butte-Silver Bow County Railroad Accidents; 1990 - 2015

Date	Nearest Town	Injuries	Fatalities	Cars Carrying Haz-Mat	Haz-Mat Cars Damaged	Comments
8/16/1990	Silver Bow	0	0	5	0	1 car derailed
10/8/1990	Feely	0	0	1	1	1 car derailed. No haz-mat released.
12/30/1990	Silver Bow	0	0	0	0	8 cars derailed
4/4/1991	Maiden Rock	0	0	0	0	4 engines and 2 cars derailed
9/20/1992	Silver Bow	0	0	0	0	4 cars derailed
6/28/1993	Silver Bow	0	0	0	0	4 cars derailed
9/4/1993	Silver Bow	0	0	0	0	5 cars derailed
9/22/1993	Feely	0	0	4	3	10 cars derailed
11/13/1993	Maiden Rock	0	0	4	1	5 cars derailed. No haz-mat released.
2/25/1994	Maiden Rock	0	0	8	1	6 cars derailed. 200 gallons of crude oil released from 1 car
1/12/1996	Silver Bow	0	0	3	1	16 cars derailed
2/24/2000	Garrison	0	0	4	3	3 car derailed. No haz-mat released.
5/9/2003	Butte	0	0	0	0	2 cars derailed
8/12/2004	Butte	0	0	5	0	No derailment
3/17/2005	Silver Bow	0	0	0	0	3 engines derailed
5/30/2006	Butte	0	0	0	0	7 cars derailed
10/16/2006	Butte	0	0	16	8	6 cars derailed. No haz-mat released.
2/15/2007	Silver Bow	0	0	0	0	3 cars derailed
1/17/2008	Silver Bow	0	0	0	0	4 cars derailed
6/30/2010	Silver Bow	0	0	0	0	1 engine derailed
9/10/2010	Silver Bow	0	0	0	0	3 engines derailed
8/12/2014	Butte	0	0	5	5	6 cars derailed.
4/30/2015	Silver Bow	0	0	1	1	8 cars derailed. No haz-mat released.
6/4/2015	Silver Bow	0	0	0	0	3 engines derailed
TOTAL		0	0	50	23	

Source: Federal Railroad Administration, 2016

<http://safetydata.fra.dot.gov/OfficeofSafety/publicsite/Query/incabbr.aspx>

Table 4.6-3. Butte-Silver Bow County Accidents at Railroad Crossings: 1990 - 2015

Date	Nearest RR Station	Road	Road Type	Fatalities	Injuries	Crossing Protection
4/4/1991	Maiden Rock	Private	Private	0	5	Cross bucks
1/3/1996	Silver Bow	MT Secondary Road	Public	0	1	Flashing lights
12/29/2006	Butte	Kaw Ave.	Public	0	0	Gates
3/14/2008	Silver Bow	Buxton Road	Public	0	0	Cross bucks
1/1/2008	Melrose	Trapper Creek Road	Public	0	1	Cross bucks
2/25/2014	Butte	2 nd Street	Public	0	0	Flashing lights
TOTAL				0	7	-

Source: Federal Railroad Administration, 2016;

<http://safetydata.fra.dot.gov/OfficeofSafety/publicsite/Query/gxrabbr.aspx>

Aviation accidents can occur for a multitude of reasons from mechanical failure to poor weather conditions to pilot error. They are often fatal to the occupants. BSB County is primarily served by the Butte Bert Mooney Airport which handles approximately 65 flights per day. The majority of these flights are non-commercial; however, several commercial flights arrive and depart each day.



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The mountainous terrain of BSB County makes the area particularly hazardous for aircraft. Varying weather conditions and sharp changes in elevation do not allow pilots much flexibility during takeoffs and landings. With the airport's close proximity to Butte and other developed areas, an accident could potentially occur within a populated, downtown area.

BSB County does not typically have major aviation incidents; however, in 1950, a commercial jet crashed into the East Ridge during a blizzard and killed all 21 passengers. And on Marcy 22, 2009, 14 people on board the single engine turboprop aircraft died when it crashed into a cemetery while on approach to Bert Mooney Airport. The passengers, three families of friends with their children all under 10, were flying to a ski vacation near Bozeman but diverted to Butte while en route, for unknown reasons.

Federal Aviation Administration (FAA) database listings for aircraft accidents in BSB County are presented in **Table 4.6-4**.

Table 4.6-4. Butte-Silver Bow County Aircraft Accidents

Date	Location	Fatalities	Aircraft Type
11/6/1950	East Ridge	21	Northwest Orient Airlines #115
6/8/1958	9 miles East of Butte	3	-
3/21/1964	Southeast of Butte	2	-
4/17/1971	Sheridan Plane Crash	4	-
4/27/1974	Red Mountain	2	Canadian plane
7/25/1976	JC Penney's	3	Cherokee plane
4/1/1980	Red Mountain	2	Montana Power plane
9/16/1982	Divide	1	Cessna 152
11/6/1986	Butte	1	Cessna 421C
3/28/1991	Butte	1	Piper PA-30
1/26/1995	Butte	1	Beech E18S
12/16/2005	Butte	1	Piper PA-28-181
3/18/2006	Butte	2	Beech C99
3/22/2009	Butte	14	Single Engine Turboprop
3/19/2011	Butte	1	Cessna T310R
8/15/2011	Silver Bow	2	Piper PA-38-112
TOTAL		61	

Source: FAA, 2016; http://www.faa.gov/data_research/accident_incident/

There have been two aviation accidents with fatalities since the BSB County PDM Plan was last updated. Reports from the Federal Aviation Administrations are summarized below.

March 19, 2011 - A Cessna T310R crashed during a missed approach at Bert Mooney Airport. The commercial pilot sustained fatal injuries. The airplane sustained substantial damage, and was consumed by a post-crash fire. Instrument meteorological conditions prevailed, and an instrument flight rules flight plan had been filed. A witness, located in his residence 3.5 miles northwest of the end of runway reported that snow began to fall in the area. He stated that the snow fall was unusually heavy, and obscured his view across the street. He then became aware of a very loud airplane engine sound, so loud that his reaction was to duck. He stated that he did not hear the sound of an explosion or impact. Another witness located in his office on the campus of Montana Tech, about 4 miles northwest of the runway, reported similar weather conditions and aircraft sounds about the same

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time. By the time he left his office, about 2 hours later, he observed vehicles in the parking lot encrusted with a layer of 1.5- to 2-inch-thick snow and ice.

August 15, 2011 - The purpose of the instructional flight was to have the student conduct a series of touch-and-go landings before proceeding to the training area where he intended on having the student practice steep turns, turns around a point, and holding a level altitude. A witness located near the accident site reported seeing the airplane flying in a clockwise horizontal circle with the wings almost vertical, while slowly losing altitude. The airplane appeared to be attempting to straighten out and climb when it then went straight down in a nosedive. Post-accident examination of the airframe, flight control system, and engine revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation. From the witness observations, it is likely that the airplane entered a spin and the pilot was not able to regain control. It could not be determined who was at the flight controls at the time of the accident. There were two fatalities.

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

Vulnerability and Area of Impact

Privately-owned vehicles provide transportation for individuals in BSB 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 frequently. Railroad related hazards such as derailments, toxic spill contamination, and vehicle collisions are a threat to BSB 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.

The PDM vulnerability analysis performed for Hazardous Material Incidents buffered the highways and railroads in BSB County by 0.25 miles and using GIS intersected this layer with the MDOR parcel database to determine the number of residences, commercial, agricultural and industrial buildings at risk. See *Plan Section 4.3* for the results of this analysis.

Probability and Magnitude

BSB County is vulnerable to all types of transportation emergencies. The magnitude of a transportation accident event would be determined by many factors including the location of impact and number of passengers. Little, if any, warning exists for transportation accidents. The greatest magnitude event would be one where mass fatalities result. A mass casualty incident involving a school bus is also a possibility and a concern since rural locations have limited resources making response time slow which could delay treatment of the injured.

In the past 10 years, there have been 1,452 motor vehicle accidents that resulted in 28 fatalities and 386 injuries in BSB County. Therefore, the probability of future highway accidents is rated as “highly likely”. The PDM Steering Committee rated the railroad accident hazard as “probable” occurring less than once per decade, and the aircraft accident hazard as “likely” occurring more than once a decade but not every year.

Future Development

BSB County has no land use regulations that restrict building around industrial facilities or along transportation routes.

4.7 Communicable Disease

CPRI SCORE = 2.5

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 BSB 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 BSB 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 BSB 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:

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- 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.

Another quarantine was in place from September 15, 1934 to November 1, 1934 for children under the age of 18 after seven cases of poliomyelitis (infant paralysis) were discovered. Similar disease events could potentially occur in the future depending on the medical services available and treatment effectiveness.

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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, including one in BSB County.

The Montana Department of Public Health and Human Services manages a database of reportable communicable disease occurrences. The communicable disease summary for BSB County between 2005 and 2014 is presented in **Table 4.7-1**.

Table 4.7-1. Butte-Silver Bow County Communicable Disease Summary

Disease	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<i>Vaccine Preventable Diseases</i>										
Hepatitis A	0	0	0	0	0	0	0	0	0	1
HIB	0	0	0	0	1	0	0	0	0	0
Meningitis	2	3	0	0	0	2	0	1	0	0
Meningococcal	0	0	0	0	0	0	1	1	0	0
Mumps	0	0	0	1	0	0	0	0	0	0
Pertussis	3	2	14	0	0	3	0	2	29	26
Strep Pneumonia	0	0	0	0	1	0	1	0	0	2
Tuberculosis	1	1	-	-	-	1	0	0	0	
Varicella	0	0	5	4	0	0	1	2	0	1
<i>Enteric Diseases</i>										
Campylobacter	3	4	1	2	3	3	5	4	1	2
E Coli	0	1	0	0	0	0	0	0	0	4
Giardia	2	3	3	1	2	2	0	0	1	0
Salmonella	5	5	3	1	1	5	3	3	1	6
Shigella	0	0	-	-	0	0	0	0	1	0
<i>Other Communicable Diseases</i>										
Lyme Disease	0	0	0	0	0	0	0	0	0	1
STD	-	100	109	96	66	-	101	100	112	130
West Nile Virus	0	0	0	0	0	0	0	0	1	0

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 BSB County as opposed to structures. The entire population is at risk for contracting disease. The more urban nature of Butte 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, BSB County is assumed to have the same communicable disease risk county-wide.

Probability and Magnitude

The probability of an epidemic in BSB 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”. The PDM Steering Committee rated the probability as “likely” considering that a global communicable disease outbreak.

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 (WHO), 2009). Such a pandemic affecting BSB 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.

While the USA has seen many Ebola stories, Ebola virus news for the state of Montana has been minimal. The county had officials from the police station, hospital and the health department discuss what they would do if Ebola came to the BSB County and conducted an exercise during April 2015. The health department has said the likelihood of Ebola showing up in Montana is small.



Montana’s local and state public health officials are monitoring developments regarding Zika virus closely. At this time, the impact of Zika in Montana will likely be confined to individuals returning from or planning travel to Zika-affected areas and Montana’s mosquitoes are not expected to be able to transmit the virus.

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.

4.8 Terrorism, Civil Unrest and Violence

CPRI SCORE: 2.95

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 (active shooters) 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.

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.

According to the Southern Poverty Law Center (2015), an organization devoted to tracking hate groups in the United States, eight hate groups were active in Montana during 2014, including four White Nationalist organizations in the Flathead: National Policy Institute in Whitefish, Pioneer Little Europe in Kalispell, Washington Summit Publishers in Whitefish, and Radix Journal in Whitefish; two Neo-Nazi groups Creativity Alliance, National Socialist Movement; and two Ku Klux Klan groups in Great Falls.

On December 20, 1989, two police officers and two firefighters were injured when a man detonated explosives in his car in Uptown Butte while negotiating with law enforcement. This type of violence, although rare, is still a distinct threat to the community.

Eight bomb threats were called into the BSB Courthouse including one to Butte High School during mid-January and early February, 2016. The bomb threats forced evacuation of the buildings and disrupted regular operation. The first call was received by a justice court employee who said it sounded like a recording in a male's voice saying there were bombs in the building. It said if all

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prisoners were not released within 30 minutes, “there will be a massacre”. BSB Law Enforcement worked with the FBI and the federal Dept of Homeland Security in an attempt to locate the source of the calls. Law Enforcement determined that the calls did not pose an imminent threat but protocol and evacuations were followed just in case.

Civil unrest typically occurs when large groups, organizations, or distraught individuals take action with potentially disastrous or disruptive results. Civil unrest can be the product of another event that creates panic in the community. The potential exists in BSB County for civil unrest or strikes that exceed the capabilities of the local government to handle. Butte in particular has a colored history of strikes and civil instability. Some of the notable strikes that have occurred in BSB County can be found in **Table 4.8-1**.

Table 4.8-1. Historic Strikes in Butte-Silver Bow County

Organization	Approximate Start Date	Approximate Duration	Notes
Mine workers	6/25/1878	63 days	-
Newspaper workers	2/13/1907	44 days	-
IWW	4/19/1920	Unknown	-
Newspaper workers	6/20/1927	15 days	-
Mine workers	5/8/1934	135 days	-
FERA relief workers	12/26/1934	Unknown	-
Mine workers	8/27/1951	11 days	-
Railroad workers	3/5/1959	2 days	-
Mine workers	8/18/1959	181 days	-
Copper workers	6/15/1967	258 days	\$5.5 million lost in wages
Teachers	4/10/1970	2 days	-
Mine workers	7/25/1977	109 days	-
Firefighters	9/17/1978	11 days	Government offices closed
Teachers	1/6/1986	3 days	No school

Source: Butte-Anaconda Almanac at Butte-Silver Bow Public Archives

Other examples of civil unrest include a jail riot that broke out on March, 18, 1912 and the April 21, 1920 Anaconda Road Massacre where 15 people were shot during the International Workers of the World strike. This incident prompted federal troops to take action in Butte the following day. More recently in April of 1997, the nurses at St. James Hospital in Butte set a strike date. Fortunately, this strike was averted and healthcare services in BSB County were not compromised.

Over the past several years the union presence in Butte has diminished; however, there is still a very strong core of union employees and supporters in the communities. Any time there is a possibility of a strike or pickets, the matter is taken very seriously by all, including law enforcement.

Although major incidences have not occurred to date, the 4th of July celebration is a particularly vulnerable time for civil unrest due to the number of large events. Another major event within Butte-Silver Bow is the annual St. Patrick’s Day celebration due to open alcohol consumption and a large influx of visitors, college students, and celebrations. This activity usually starts on the day prior to St. Patrick’s Day and continues through the early morning hours, if not into the day following St. Patrick’s Day. The Montana Folk Festival and Evil Knievel Days are also annual events in BSB County which draw thousands of people to the county.

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Violent protests and riots resulting from police brutality against African Americans gained widespread notoriety in the 2010s, and the tensions ignited after particular incidents such as the killings of Trayvon Martin (2012), Micheal Brown, Jr (2014) and Freddie Gray (2015). Due to the demographics of BSB County, racial violence is not likely to present a great risk.

No disaster declarations have been issued to BSB County for terrorism or civil unrest. Emergency declarations in Montana for terrorism and civil unrest are summarized in **Table 4.8-2**.

Table 4.8-2. Montana Terrorism and Civil Unrest Declared Disasters and Emergencies

Declaration	Date	Magnitude	Comments
N/A	Jan-Feb 1979	Activation of National Guard for State Institutions strike	No casualties; \$1,393,714 costs
State EO-03-91	April 1991	Activation of National Guard and Assistance Statewide for State Institutions Strike	No casualties
State EO-10-96	April 23,1996	Incident Response for Anniversary of Waco and Oklahoma City Incidents	No casualties; \$4,368 costs
State EO-23-01	September 11, 2001	Emergency Declaration following the World Trade Center and Pentagon terrorist attacks	No casualties
State EO 26-01	September 28, 2001	National Guard activation to provide personnel for airport security	No casualties

Source: BSB County PDM Plan, 2010

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 BSB County.

The densely populated urban area of Butte is the most vulnerable to the terrorism hazard due to the close proximity to hazardous materials facilities and government buildings. Domestic and international terrorism can be hard to predict, and therefore, specific targets cannot be identified. As a whole, BSB County is at a very low risk of terrorism in comparison to other parts of the country. BSB County hosts many large events which bring in thousands of people to the county, making it more at risk of becoming a terrorist target.

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

Probability and Magnitude

The probability of a terrorist or civil unrest event affecting BSB County directly is difficult to determine. The county is not considered a specific terrorist target not is it an area of high risk for civil unrest. As with any area, a shooting by a disgruntled person, employee, or student is always



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possible. A large-scale attack cannot be ruled out, and therefore, a small probability exists. Of greater probability is a terrorist attack that has an indirect effect on the county through its economy.

The effects of terrorism can vary significantly from loss of life and injuries to property damage and disruptions in services such as electricity, water supply, public transportation, and communications. Cyber-terrorism could involve destroying 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.

Due to the lack of past events in BSB County, the probability of future terrorism events is rated as “infrequent”. The PDM Steering Committee rated the terrorism/civil unrest/violence hazard as “likely” due to the frequency with which these somewhat random events are impacting U.S. communities. Terrorism is considered an emerging hazard with little to no history in the region but sporadic incidents occurring with more frequency across the nation.

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.

4.9 Flooding and Dam Failure

CPRI SCORES:
DAM FAILURE = 2.65
FLOODING = 2.1

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. Ice jams can be problematic on the Big Hole River, in southern BSB County. Dam failure is also a possibility with areas in the dam’s inundation area subject to flooding.



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.

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 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 4.9-1**.

Table 4.9-1. Warning and Advisory Criteria for Flooding

Flooding	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

A FEMA Flood Insurance Study (2012) studied drainages in BSB County both east and west of the Continental Divide. This report describes many of the drainages in BSB County, as follows.

- Silver Bow Creek has lost major portions of its drainage area to the Berkeley Pit (an open pit copper mine). Silver Bow Creek flows from the weed concentrator southeast to its confluence with Blacktail Creek at Montana Avenue. It then flows generally east through the Town of

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Rocker, turns, and flows northerly near Gregson, Montana, where it leaves Butte-Silver Bow County.

- Gregson Creek arises from a small drainage in the Rocky Mountains just north of the Continental Divide and flows into Silver Bow Creek near Fairmont Hot Springs.
- Grove Gulch Creek and Sand Creek arise from the east side of a ridge that runs in a north-south direction on the south side of Silver Bow Creek. Grove Gulch Creek runs through southwestern Butte. The flood profile of Grove Gulch Creek stops at the landfill dump. Parts of the floodwaters are diverted across Little Basin Creek Road. The floodwaters that remain in Grove Gulch Creek are carried under a tailing pile in a pipe. Sand Creek enters the City of Butte on the south and flows northeast. Both of these streams have floodplains with widths less than the Federal Insurance Administration requirements and have had problems with building and encroachments completely across the channel.
- Basin Creek and Blacktail Creek arise on the Continental Divide south of Butte and flow northerly towards and through the south-western portion of the City. Blacktail Creek runs generally north-east through Butte to Silver Bow Creek.
- Tramway Gulch, Reese Canyon, Brookside Canyon, and Mode-S Canyon all arise on the western slope of the Continental Divide and flow westerly to their confluence with Blacktail Creek. The flood plains are narrow in some reaches and have a history of complete blockage of channels.
- Big Hole River near Melrose is located east of the Continental Divide. This stream runs south past the city in two channels. The center of the easternmost channel (Melrose side) is the county limits.
- The City of Butte and its adjacent areas are experiencing heavy residential and commercial development on the flood plains. In the outlying areas, flood plain development is almost exclusively for recreation and resort areas.

Some significant historical flood events in BSB County include: the Big Hole Flood on June 14, 1927; the Butte Flood on July 30, 1931; and another Butte Flood on March 28, 1943. The March 28, 1943 flood occurred when snowmelt caused flooding to wash out several railroad and street bridges. Damages were estimated at the time as \$12,000 - \$14,000. Accounts of other flood events in the county are presented below.

Spring 1908 – Heavy rains and high water caused multiple rail line breaks, loss of power and communication, and failure of the Moulton dam and dam on White’s Reservoir. This was the flood that carried tailings from Butte all the way to Bonner (Missoula County), creating a streamside dead zone for all of Silver Bow Creek and stretches of the Upper Clark Fork River. The great flood left more than 6.6 million cubic yards of waste, laden with heavy metals and arsenic, in the sediment behind the Milltown Dam which was designated as a Superfund site in 1983.

June 21, 1967 - Heavy rainfall caused a flash flood in Butte and the surrounding areas. Western Iron Works, the Bishop building, and the Capri Motel were all flooded. Damages to City property were estimated at \$50,000, and the Capri Motel suffered an estimated \$100,000 in damages. Reports also indicate that part of Dublin Gulch was washed out.



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July 23, 1991 - A flash flood near Silver Bow Creek held up rail service near Gregson because of track stability fears. Another heavy rain event on June 28, 1992 caused damages near Harding Way (Montana Highway 2) and resulted in the repair of culverts and roads in the German Gulch area.

July 29, 1996 - Eight miles south of Butte, Little Basin Creek ran over its banks due to heavy thunderstorm rainfall. Runoff from this thunderstorm caused some county roads near the creek to wash out according to National Weather Service reports.

July 30, 1998 - Torrents of rain and hail fell on Butte in an hour-long thunderstorm which dumped over 2 inches of rain and hail depths of up to four inches over most of urban Butte. Blacktail Creek was over its banks in many areas. Silver Bow Creek was also at flood stage for its length through Butte's highly populated urban area. The major Butte thoroughfares of Montana Street and Harrison Avenue were also flooded and impassable during the peak of the storm. Debris from Uptown Butte washed down large rocks and boulders, creating a hazard on many of the public streets. In some areas, underground power lines were washed out leaving residents without power for two to three days. Telephone service was also out in many areas for a period of hours to four days. Many private homes suffered flooded basements, yards, and garages. Two trailer parks, located along Grove Gulch Creek, suffered major damage. The Centerville Volunteer Fire Department also sustained major water damage. Local EPA officials called the storm a 25-year event because the storm water drainage channels designed for ten-year events were easily overflowing.

June 4, 1999 - Garfield Avenue in Butte was under five feet of water due to inadequate storm drainage. Also affected were Stuart Avenue, Pine Street, and Silver Bow Boulevard.

PDM Steering Committee members indicated that in the spring of 2009, Blacktail Creek flooded buildings during a period in which Harrison Avenue was under construction. In 2013, it was discovered that the storm drain at Butte High School was not installed correctly and flooding due to heavy rains destroyed the pavement in the parking lot.



According to the 2012 FEMA Flood Insurance Study, Silver Bow Creek near Rocker has caused severe flooding in the past. Flooding has also caused problems along the low-lying areas of Sand Creek. The largest flood recorded on Sand Creek was on July 31, 1931, as the result of a thundershower preceded by a less intense rainfall. During this storm, the Chicago, Milwaukee, St. Paul and Pacific Railroad tracks were washed out. Several houses were flooded at that time, and the areas now have a heavier concentration of rainfall. Two floods on Grove Gulch Creek in the vicinity of the landfill have caused flooding over the top of Little Basin Creek Road.

BSB County has had two federal disaster declarations due to flooding, as listed in **Table 4.9-2**. Statewide flood emergencies were declared in 1978, 1981, 1984, 1986, 1997, 1998, 2003 and 2013 (DMA, 2015).

Table 4.9-2. Federal Disaster Declarations for Flooding

Year	Event	FEMA Disaster No.	Details
1981	Flood	FEMA-640-DR-MT	Widespread event across the State resulting in \$76,000 in Butte-Silver Bow and increased damages on statewide level.
1996	Flood	FEMA-1105-DR-MT	Widespread flooding across the State. Sand Creek, within Butte's urban area, flooded causing damage to numerous properties. BSB subsequently applied for and received a FEMA Hazard Mitigation Grant Program grant to install larger culverts at several public road intersections along the Sand Creek drainage.

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

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 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 in **Table 4.9-3**.

Table 4.9-3. Hazard Ratings for Dams

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

Source: National Inventory of Dams, 2015

BSB County has three high hazard dams and one significant hazard dam within the county. In addition to these dams, BSB County owns three dams in neighboring Deer Lodge County. **Table 4.9-4** presents details on these dams and **Figure 9** shows their location. There are no dams in adjoining counties with the potential to impact BSB County.

Table 4.9-4. Butte-Silver Bow County Dams

Dam Name	Drainage	NID Height (feet)	NID Storage (acre-ft)	Drainage Area (sq. mi)	Year Finished	Hazard	Owner
Basin Creek Dam #1	Basin Creek	101	1,170	12.4	1897	High	BSB County
Basin Creek Dam #2	Basin Creek	49	290	4.72	1907	High	BSB County
Yankee Doodle Tailings Dam	Yankee Doodle & Silver Bow Creeks	720	7,200		1972	High	Montana Resources
South Fork Reservoir	Divide Creek	20	51		1946	Significant	BSB County
Dams Owned by BSB County Located in Deer Lodge County							
Silver Lake West Dam	Georgetown Lake	17	17,920	1.90	1918	High	BSB County
Storm Lake Dam	Storm Lake Creek	29	2,150	1.90	1898	High	BSB County
Silver Lake East Dam	Storm Lake Creek	11	17,920	1.90	1918	Low	BSB County

Source: National Inventory of Dams, 2015

There is record of several dam failures in BSB County. On June 4, 1908, White’s Reservoir dam broke flooding Butte and leaving the city without phones, telegraphs, electricity, street cars or railroad service. The rivers were quite swollen from this event; however, levels returned to normal by June 13th. There are also reports that the Moulton dam failed in the spring of 1908. Then on July 11, 1916, Superior Dam, north of Meaderville, broke and tailings flooded the north end of East Butte causing \$8,000 in estimated damages. There have been no federal disaster declarations issued to BSB County for dam failure.

Vulnerability and Area of Impact

The history of flooding in BSB County shows that a hazard is present not only from riverine flooding, but from flash flooding of urban areas. Flash flooding can be most problematic to public infrastructure such as roads. As history has shown, stormwater from uptown Butte has caused urban flooding problems. However, specific facilities have not been identified as susceptible to flash flooding. Flash flooding many times occurs without warning and catches people by surprise.

Figures 8 and 8A present the flood-prone areas within BSB County and Butte, respectively. These maps were developed from updated hard copy flood insurance rate maps digitized by FEMA. 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.

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 9 and 9A** present the inundation area associated with the high hazard dams in BSB County and Butte, respectively. BSB OEM has EAPs for these dams and conducts regular exercises with the dam owner(s) and other emergency response personnel.

The Basin Creek Dams have inundation areas that extend into the populated areas of BSB County. An analysis of the inundation maps shows the flooding would extend along parts of Basin, Blacktail, and Silver Bow Creeks. Numerous structures could be affected in areas north, south, and east of the airport, the southern part of the Butte urban corridor known as the Floral Park, and south of Rocker, Nissler, and Ramsay. As the dams continue to age, they present a greater hazard without mitigation or dam repair. Renovations were made to the Basin Creek Reservoir dam and spillway in February, 2006 (BSB Growth Policy, 2008).



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The Yankee Doodle Tailings Impoundment is not a water-retaining dam. There is no water stored on the upstream face of the impoundment. Fine grained, pulverized rock is contained by the impoundment and the beach created by the impoundment extends approximately one-mile north to the interface of the water. According to the Emergency Action Plan (Montana Resources, 2015), no threat to public health or property exists from any potential breach of the impoundment. Potential hazards include the possible inundation of Montana Resources' tailing pumping system booster stations, access to the precipitation plant, heavy equipment repair facility and the Horseshoe Bend Water Treatment Plant. Participants at the PDM Public Meeting expressed concern that failure of the Yankee Doodle Tailing Dam would inundate the uptown Butte area. This is not the case however, as shown on **Figure 9**.

In April 1993, a seismic evaluation was done on the Yankee Doodle Tailings Dam at the confluence of Yankee Doodle and Silver Bow Creeks for its owner, Montana Resources. The dam is located northeast of Butte and functions as a waste rock repository and impoundment for tailings from mining operations. This evaluation found the dam to be seismically safe when modeled under maximum credible earthquake conditions. This evaluation was done by Harding Lawson Associates and can be found at the BSB County OEM.

Dam failure inundation areas for Silver Lake West Dam and Storm Lake Dam, although owned by BSB County, would not affect Silver Bow County but rather neighboring Deer Lodge County and is therefore, not further discussed in this Plan.

Flood Protection Measures

According to the FEMA Flood Insurance Study (2012), Silver Bow Creek, between Montana Avenue and the weed concentrator, is the only stream in Butte with any extensive flood protection measures. The channel in this area has been straightened and, in some segments, embankments have been built up on both sides of the stream.

Near the J.C. Penney parking lot, floodwaters from Sand Creek are partially diverted to Basin Creek. This relieves some of the potential flood hazard downstream on Sand Creek. A Resource Conservation and Development project, a county project under the U.S. Soil Conservation Service, improved the channel for the diverted waters on the east side of Harrison Avenue but does not affect the flood elevations on Sand Creek.

Tramway Gulch has a dike on one side of the channel that lowers the flood hazard in the area of detailed study.

A Resource Conservation and Development Project on Grove Gulch Creek near the sanitary landfill dump, Montana Street, and Lexington Avenue was funded to mitigate flooding and sediment loading. Several small dikes were installed to prevent flooding, a sediment basin near the landfill was constructed to reduce sediment loading on the creek, and a 42-inch closed conduit approximately 2,200 feet long was installed across mine tailings west of Montana Street.

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.



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BSB County participates in the NFIP. **Table 4.9-5** presents statistics on flood insurance policies and losses.

Table 4.9-5. National Flood Insurance Program Statistics (through 12/31/2015)

Jurisdictions	Policies in Force	Insurance in Force	Number of Losses	Total Payments
Butte-Silver Bow City-County	29	\$7,287,300	9	\$8,245

Source: FEMA, 2016. <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 BSB 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. New digital FIRMs (DFIRMs) were adopted in 2012 for the entire jurisdictional area of the City and County of BSB including perennial streams such as, Silver Bow Creek, Blacktail Creek, Basin Creek, Grove Gulch Creek, Little Basin Creek, Columbia Gulch and Brown's Gulch and those portions of the Big Hole River adjacent to BSB County that were not previously regulated by FEMA approved floodplain maps. The new floodplain boundaries within the town of Melrose were greatly reduced with the adoption of the DFIRMs in 2012.

The Sand Creek floodplain, which runs south to north just to the west of Harrison Avenue, was significantly reduced north of Four Mile Road. A new flood study was undertaken at that time which incorporated the impact of the Sand Creek diversion that routes a significant portion of the Sand Creek stream flow through Bert Mooney Airport property. The adoption of a new regulated floodplain for the diversion channel significantly reduced the amount of flood waters that would flow north of Four Mile Road. Consequently, the Sand Creek floodplain boundaries were significantly reduced on the new floodplain maps north of Four Mile Road.

BSB County has a Floodplain and Floodway Management Ordinance 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 BSB County. 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 BSB County. 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

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earns, the CRS assigns you to one of ten classes. Your discount on flood insurance premiums is based on your class. BSB County does not 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 4.9-6**.

Table 4.9-6. Butte-Silver Bow County Flood Events with Damages

Date	Injuries	Fatalities	Property Damage	Crop Damage	Remarks
3/17/1969	0	0	\$5,068.12	\$0.00	Flooding
8/1/1974	0	0	\$2,166.66	\$0.00	Flash Flood
2/24/1986	0.04	0.04	\$39,244.93	\$0.00	Flood
3/10/1989	0	0	\$7,222.27	\$0.00	Flooding
7/26/1989	0	0	\$9,629.69	\$96.30	Flooding
5/1/1997	0	0	\$278,787.88	\$0.00	Floods
TOTAL	0.04	0.04	\$342,119.55	\$96.30	

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

The flood hazard layer is shown on **Figure 8** and the dam inundation hazard layer is shown in **Figure 9**. Both hazard areas were intersected with the critical facility and MDOR parcel datasets using GIS (**Tables 4.9-7 and 4.9-8, respectively**). Vulnerable population was calculated based on the percentage of flood risk area in each census block.

Table 4.9-7. Butte-Silver Bow County Vulnerability Analysis; Flooding (100-Year Floodplain)

Category	Butte-Silver Bow County (Total)	Walkerville, Town
Residential Property Exposure \$	\$83,947,497	0
# Residences At Risk	427	0
Commercial, Industrial & Agricultural Property Exposure \$	\$118,932,594	0
# Commercial, Industrial & Agricultural Properties At Risk	419	0
Critical Facilities Exposure Risk \$	0	0
# Critical Facilities At Risk	0	0
Bridge Exposure \$	\$5,222,736	0
# Bridges At Risk	9	0
Persons At Risk	5,254	0
Persons Under 18 At Risk	1,194	0

The GIS analysis indicates that about 6,453 acres in BSB County (1.4 percent) are located within the 100-year flood hazard area including parcels with: 427 residences, 419 commercial, industrial and agricultural buildings, and 0 critical facilities. 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. The *Flood* section in **Appendix C** presents supporting documentation from the risk assessment including the critical facilities and bridges located in the 100-year flood hazard area.

Table 4.9-9. Butte-Silver Bow County Vulnerability Analysis; Dam Failure

Category	Butte-Silver Bow County (Total)	Walkerville, Town
Residential Property Exposure \$	\$399,193,315	0
# Residences At Risk	2,891	0
Commercial, Industrial & Agricultural Property Exposure \$	\$230,765,677	0
# Commercial, Industrial & Agricultural Properties At Risk	799	0
Critical Facilities Exposure Risk \$	\$31,243,178	0
# Critical Facilities At Risk	29	0
Bridge Exposure \$	\$5,115,136	0
# Bridges At Risk	12	0
Persons At Risk	9,853	0
Persons Under 18 At Risk	2,272	0

The GIS analysis indicates that 7,833 acres in BSB County (1.7 percent) are located in the dam inundation hazard area including 2,891 residences, 799 commercial, industrial and agricultural buildings, and 29 critical facilities. This analysis has similar limitations as those described for flooding. The *Dam Failure* section in **Appendix C** presents supporting documentation from the risk assessment including the critical facilities and bridges located in the dam inundation hazard area.

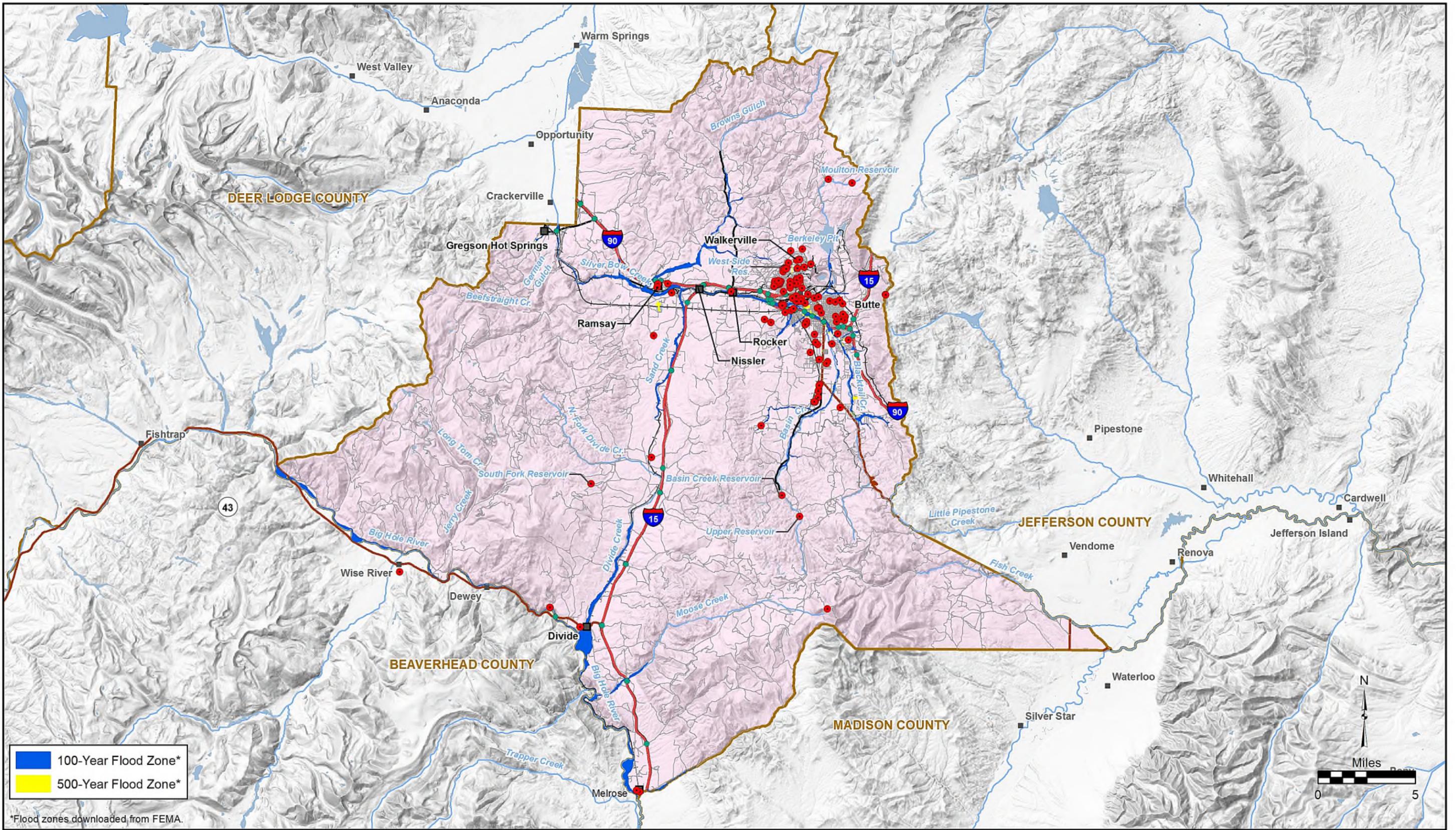
Based on the frequency of past events, the probability of flooding in BSB County is rated as “possible”; an event that occurs less than once per decade but more than once every 100 years. A dam failure event may allow for some advanced warning to the public, and therefore, the potential impact to the population is considered moderate. The probability of a high hazard dam breach in BSB County was ranked as “possible” by the PDM Steering Committee.

Future Development

Land use regulations which control building within areas that have a high risk of flooding are being used in BSB County to aid in the prevention of future flood damage. In 2012, BSB County adopted a new FIRMA maps that updated their floodplain ordinance. The purpose of the floodplain ordinance is to guide development in the floodway and flood fringe areas of any watercourse that floods and; to minimize adverse effects to adjacent property and; to maximize the safety of the public. The BSB County floodplain ordinance requirements limit all development to elevations at or above the 100-year floodplain elevation. BSB County also uses subdivision regulations which restrict building within the 100-year floodplain. These regulations adhere to the standards and requirements set forth by FEMA.

BSB County subdivision regulations do not currently prevent new construction in dam inundation areas. Dam inundation areas associated with the Basin Creek dams would affect areas in south Butte. The inundation area associated with the 700 foot tall earthen dam holding back the Yankee Doodle Tailings pond would not preclude future development in residential areas within uptown Butte.

Document Path: O:\A-GIS\Butte Silver Bow County\114-560506 - PDM Plan BSB\120-GIS\ArcMap\BSB_Flood.mxd



100-Year Flood Zone*
 500-Year Flood Zone*

*Flood zones downloaded from FEMA.



Legend

- | | | | | |
|---|---|--|--|--|
| ● Critical Facility | △ Incorporated Place | ● Bridge | Secondary Route | Lake/Reservoir |
| ○ County Seat | Place Name | — Interstate | Other Route | ~ River/Stream |
| | | Primary Route | Railroad | County |

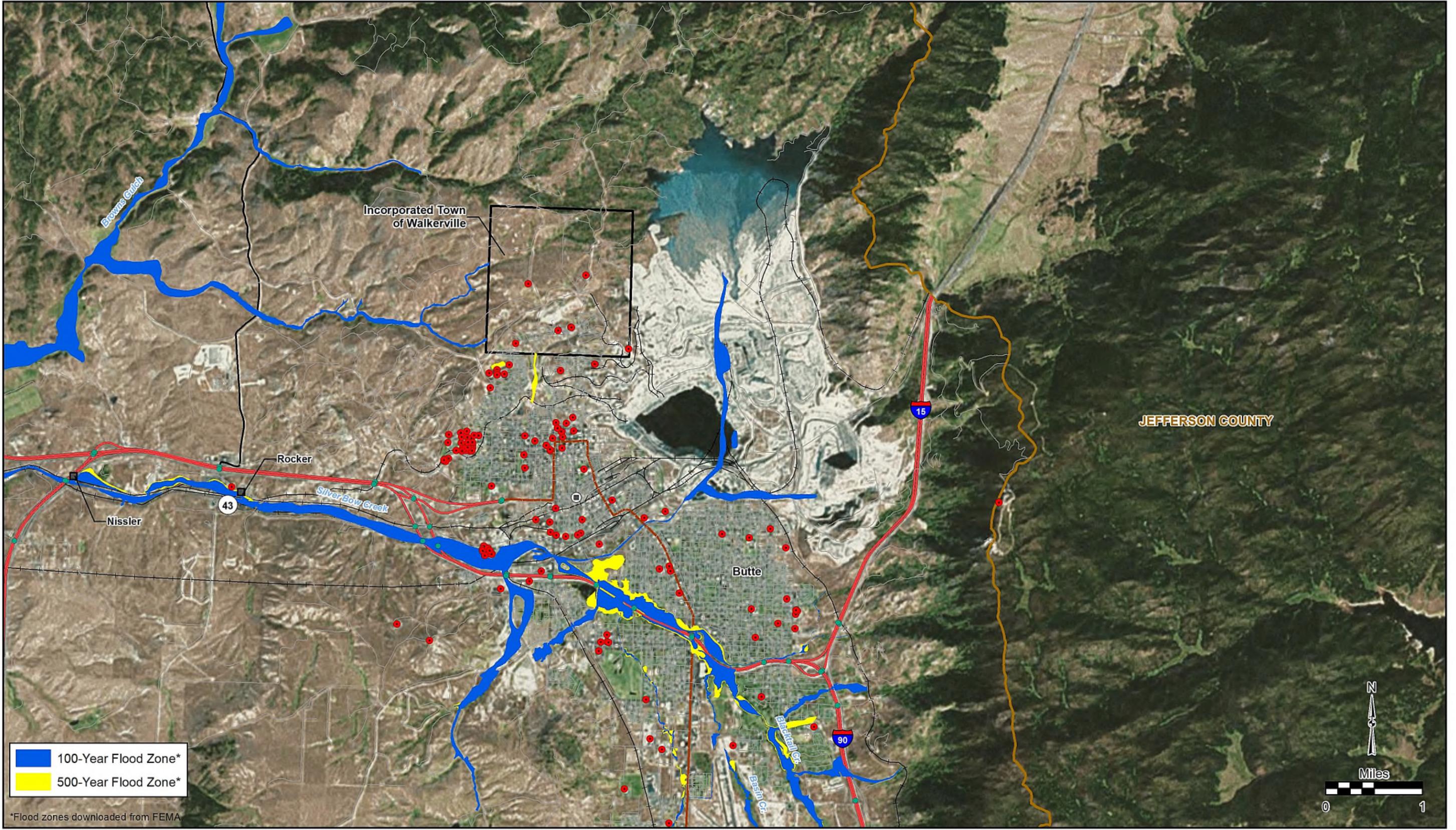


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Figure 8

**Flood Hazard Area
Butte-Silver Bow County
Pre-Disaster Mitigation Plan**

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Legend

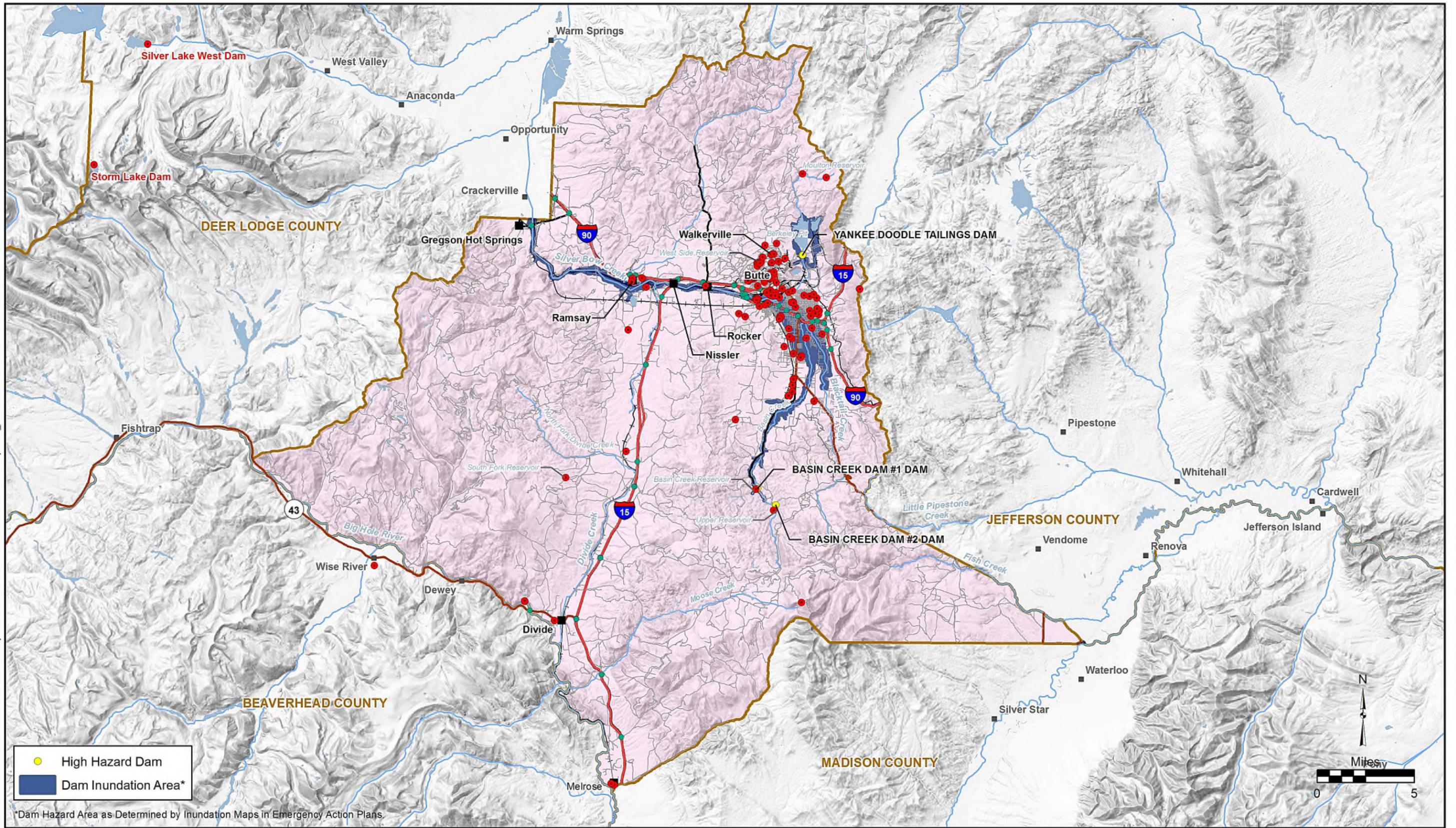
- Critical Facility
- ⊙ County Seat
- △ Incorporated Place
- Place Name
- Bridge
- Interstate
- Primary Route
- Secondary Route
- Other Route
- Railroad
- County
- Walkerville

April 2016

Figure 8A

**Butte - Flood Hazard Area
Butte-Silver Bow County
Pre-Disaster Mitigation Plan**

Document Path: O:\A-GIS\Butte Silver Bow County\114-560506 - PDM Plan BSB\120-GIS\ArcMap\BSB_DamInundation.mxd



● High Hazard Dam
 Dam Inundation Area*

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



Legend

- | | | | | |
|---|---|--|--|--|
| ● Critical Facility | Incorporated Place | ● Bridge | Secondary Route | Lake/Reservoir |
| ○ County Seat | Place Name | — Interstate | Other Route | ~ River/Stream |
| Primary Route | Railroad | County | | |

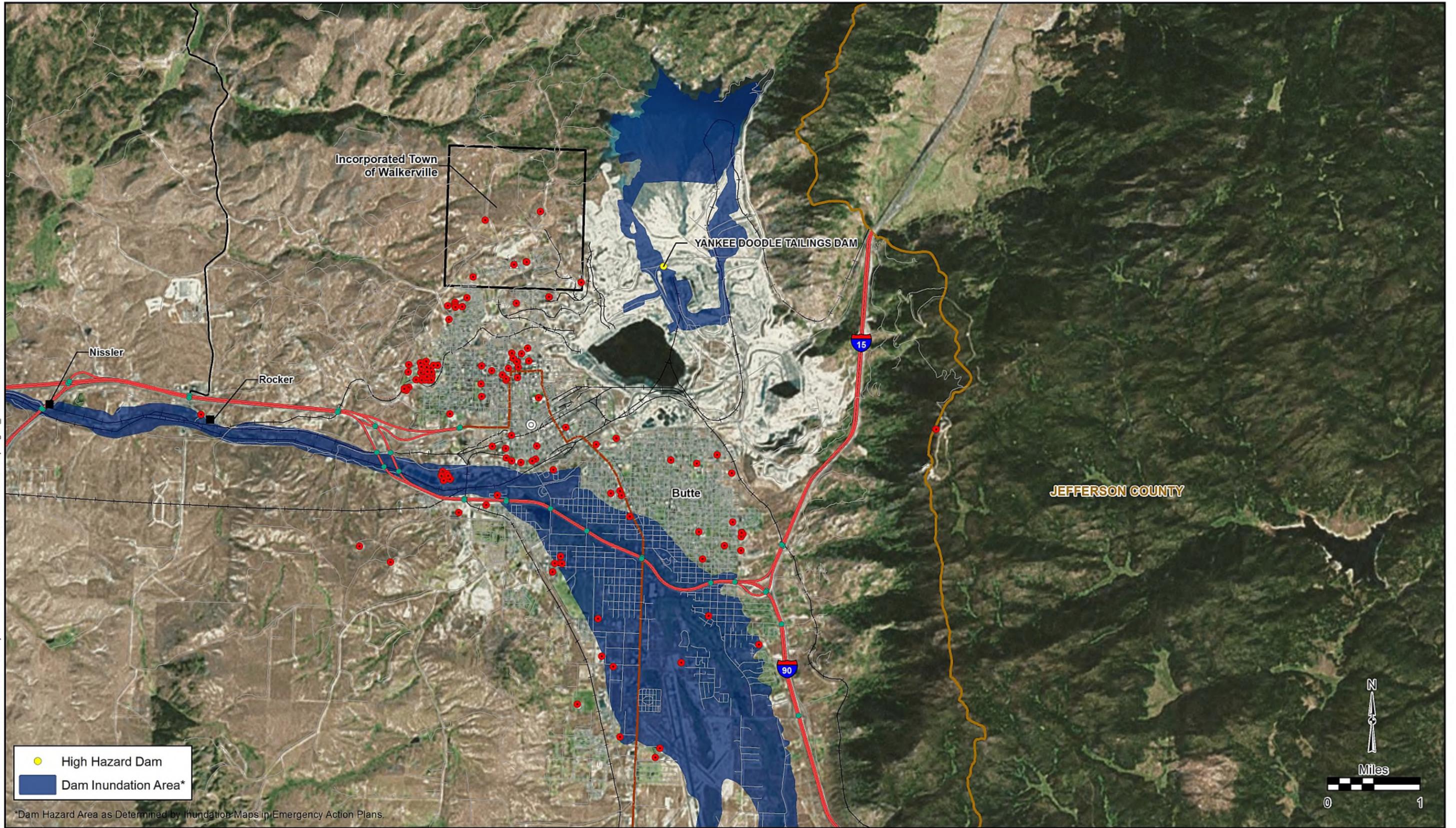


April 2016

Figure 9

**Dam Failure Hazard Area
Butte-Silver Bow County
Pre-Disaster Mitigation Plan**

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● High Hazard Dam
■ Dam Inundation Area*

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

Legend

- | | | | | |
|---|---|---|---|--|
| ● Critical Facility | △ Incorporated Place | ● Bridge | Secondary Route | County |
| ◎ County Seat | Place Name | Interstate | Other Route | Walkerville |
| | | Primary Route | Railroad | |



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Figure 9A

Butte - Dam Failure Hazard Area
Butte-Silver Bow County
 Pre-Disaster Mitigation Plan

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 BSB County or Walkerville. Neither BSB County nor Walkerville have repetitive loss properties associated with other hazards either. Annual loss estimates are presented for each hazard where damage data is available. Future development projects in BSB 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 4.12-1 and 4.12-2** present annual loss for the various hazards for residential, commercial (including industrial and agricultural buildings), and critical facilities in BSB County and the Town of Walkerville. **Appendix C** contains supporting information.

Composite Hazard Map and Future Development

Figures 10 and 10A present the composite of hazard prone areas in BSB County and the Town of Walkerville. The BSB Growth Policy (2008), as well as the Southwest Montana Comprehensive Economic Development Strategy (2012) outline areas for where future development may take place. These areas are shown on **Figures 10 and 10A**, as described below. These maps can be used to help locate future projects outside hazard-prone areas. **Table 4.12.3** indicates which hazards each of the future development areas are exposed to.

- Beef Trail/Little Basin Creek area (south of Butte near Copper Mountain Sports complex and old landfill)
- Black Tail Loop area (south of Butte, between S. Harrison Ave. and I-90, near Country Club)
- Columbia Garden Subdivision / Our Lady of the Rockies (northwest of I-90/I-15 interchange)
- Copper Fox Subdivision (west of S. Harrison Ave. and south of I-90)
- Hanson Road (west of S. Harrison Ave. and south of I-90, near new YMCA, Old Stockyards area)
- Moulton Reservoir area (north of Walkerville)
- Montana Connections Business Development Park (southwest of I-15/I-90 interchange, south of Ramsay)
- South Butte Industrial Park development (south of Butte, west of S. Harrison Ave.)
- Buxton Area (south of Butte off I-15)

Table 4.10-1. Hazard Vulnerability Summary; Butte-Silver Bow County

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
Hazardous Material	\$847,912,576	8,575	\$540,025,426	2,142	\$426,582,599	139	\$15,428,580	53	26,451	5,477
Wildfire (high & very high WUI)	\$244,987,311	1,399	\$82,592,669	595	\$141,315,692	22	\$4,604,287	13	6,533	1,468
Earthquake (>20%g)	\$647,330,256	3,600	\$187,019,599	834	\$42,341,422	35	\$3,161,364	13	9,786	2,118
Severe Weather & Drought	\$1,550,525,438	13,364	\$674,083,208	5,896	\$584,871,739	175	\$15,428,580	53	34,501	7,239
Transportation Accidents	\$847,912,576	8,575	\$540,025,426	2,142	\$426,582,599	139	\$15,428,580	53	26,451	5,477
Communicable Disease	\$1,550,525,438	13,364	\$674,083,208	5,896	\$584,871,739	175	\$15,428,580	53	34,501	7,239
Terrorism, Violence, Civil Unrest	\$1,550,525,438	13,364	\$674,083,208	5,896	\$584,871,739	175	\$15,428,580	53	34,501	7,239
Flooding (100-Year)	\$83,947,497	427	\$118,932,594	419	\$0	0	\$5,222,736	9	5,254	1,194
Dam Inundation	\$399,193,315	2,891	\$230,765,677	799	\$31,243,178	29	\$5,115,136	12	9,853	2,272

NOTES:

Critical facility values shown are likely higher than reported since replacement values were not available for many privately-owned facilities.

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 Walkerville

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
Hazardous Material Incidents	\$20,505,141	354	\$2,022,719	152	\$8,260,031	6	\$0	0	812	191
Wildfire (high & very high WUI)	\$10,507,778	117	\$1,266,984	80	\$7,532,828	2	\$0	0	450	93
Earthquake (>20%g)	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Severe Weather & Drought	\$26,148,532	386	\$4,408,020	208	\$9,015,496	7	\$0	0	844	195
Transportation Accidents	\$20,505,141	354	\$2,022,719	152	\$8,260,031	6	\$0	0	812	191
Communicable Disease	\$26,148,532	386	\$4,408,020	208	\$9,015,496	7	\$0	0	844	195
Terrorism, Violence, Civil Unrest	\$26,148,532	386	\$4,408,020	208	\$9,015,496	7	\$0	0	844	195
Flooding (100-Year)	\$0	0	\$0	0	\$0	0	\$0	0	0	0
Dam Inundation	\$0	0	\$0	0	\$0	0	\$0	0	0	0

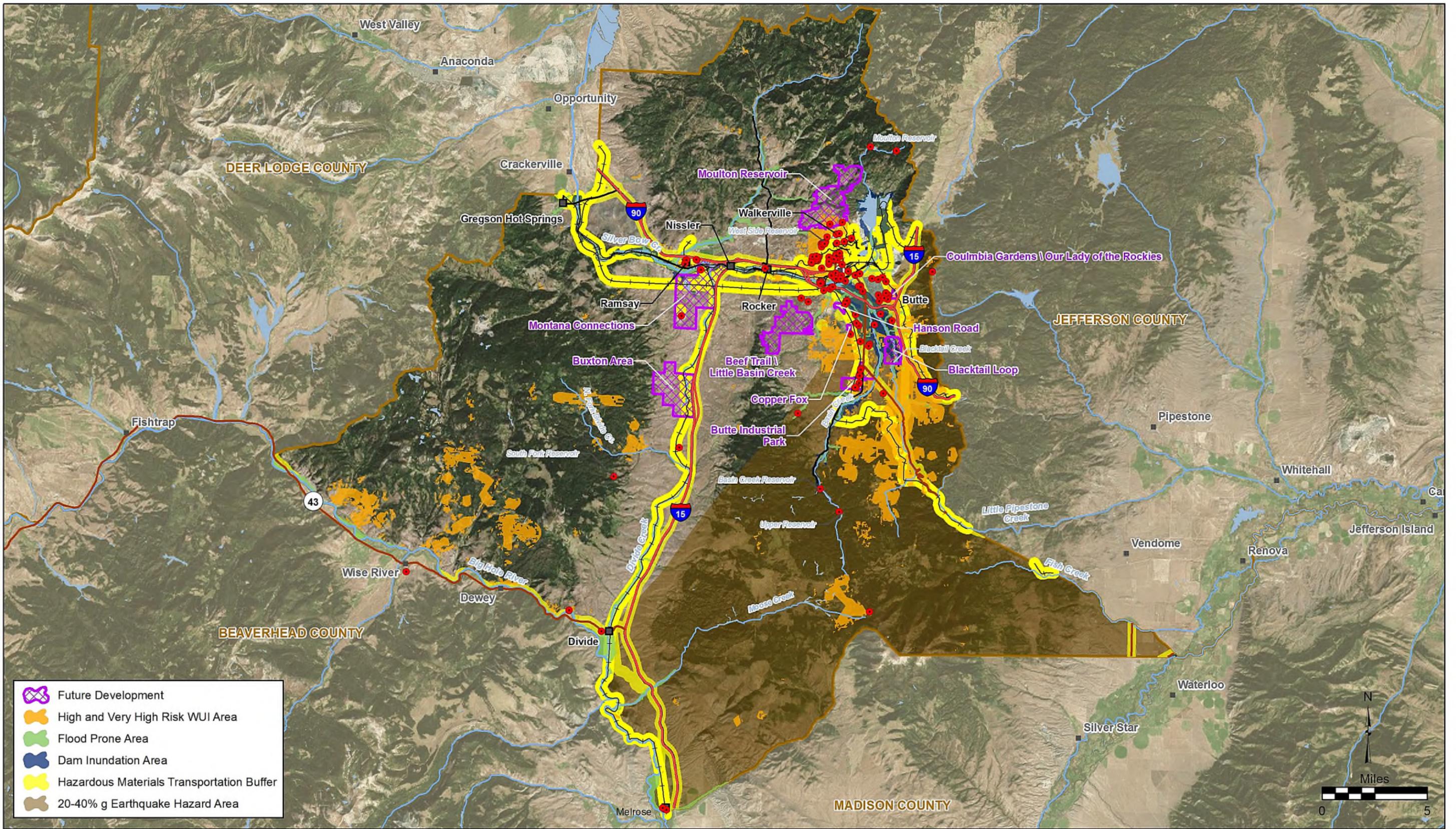
NOTES:

Critical facility values shown are likely higher than reported since replacement values were not available for many privately-owned facilities.

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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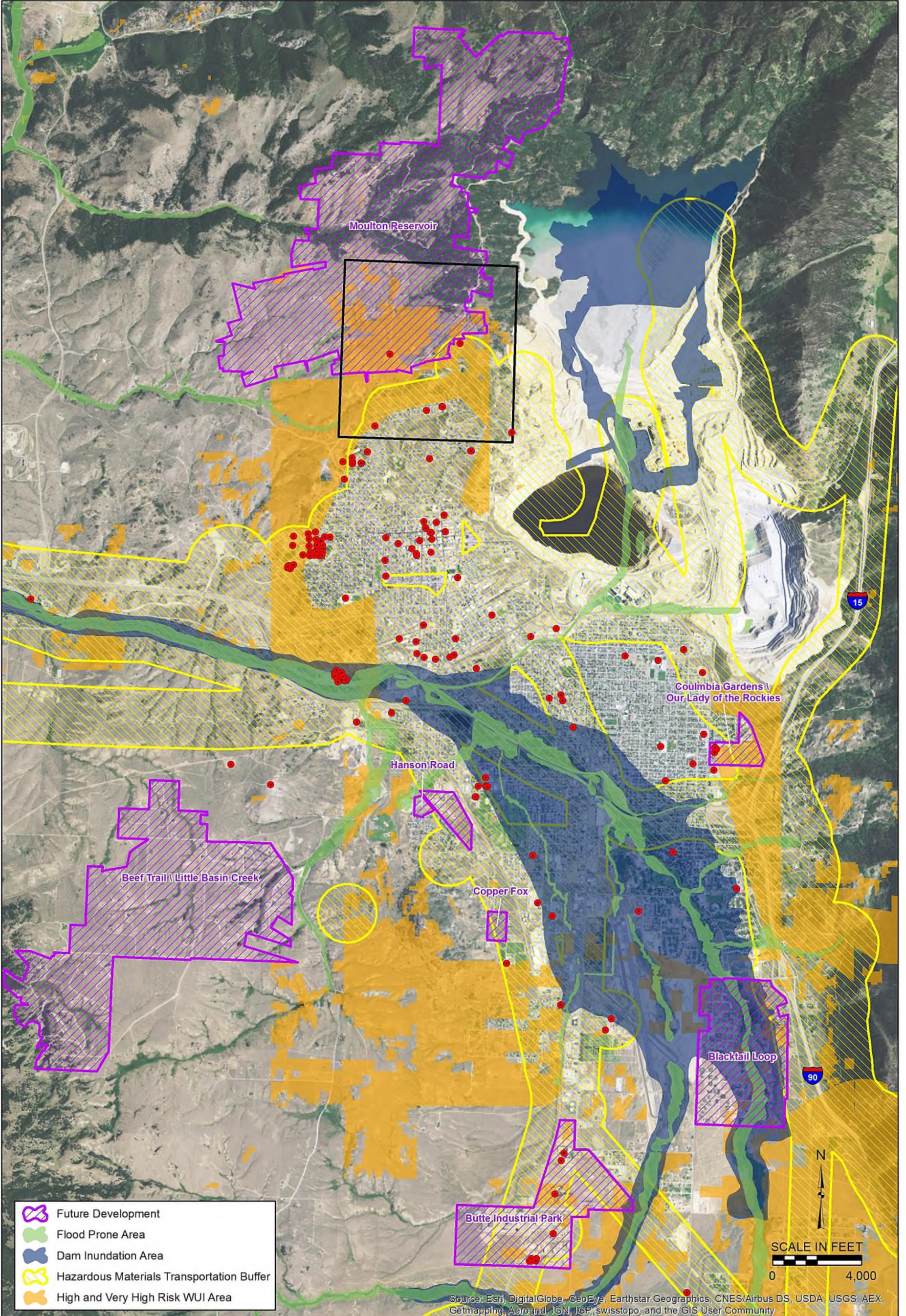
Legend

- | | | | | |
|---------------------|----------------------|--------------|-------------------|------------------|
| ● Critical Facility | △ Incorporated Place | ● Bridge | — Primary Route | ☪ Lake/Reservoir |
| ◎ County Seat | ■ Place Name | — Interstate | — Secondary Route | ~ River/Stream |
| | | — Railroad | □ County | |

April 2016

Figure 10

Hazard Composite
Butte-Silver Bow County
Pre-Disaster Mitigation Plan



Legend

- Critical Facility
- Incorporated Town of Walkerville

April 2016

Figure 10A

**Hazard Composite - Walkerville and Butte
Butte-Silver Bow County
Pre-Disaster Mitigation Plan**

Section 4: Risk Assessment and Vulnerability Analysis

Table 4.10.3. Future Development Summary

Proposed Project	Hazard Areas							
	Haz-Mat Incidents	Wildfire	Earthquake	Severe Weather	Transportation Accident	Communicable Disease	Terrorism	Flooding/Dam Failure
Beef Trail/Little Basin Creek area	No	Yes	No	Yes	No	Yes	Yes	No
Black Tail Loop area	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Columbia Garden Subdivision	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Copper Fox Subdivision	Yes	No	No	Yes	Yes	Yes	Yes	No
Hanson Road	Yes	No	No	Yes	Yes	Yes	Yes	Yes
Moulton Reservoir area	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Montana Connections Business Park	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
South Butte Industrial Park	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Buxton Area	Yes	No	No	Yes	Yes	Yes	Yes	Yes

1

SECTION 5. MITIGATION STRATEGIES

This section presents mitigation actions for Butte-Silver Bow County and the Town of Walkerville to reduce potential exposure and losses from natural, man-made, and technological hazards. The PDM Steering Committee reviewed the Risk Assessment to identify and develop the mitigation actions comprising the BSB 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. Completed and ongoing projects include the following:

Hazardous Material Incidents

- LEPC members have had training in how to participate on hazardous material teams and have been looking at equipment for their haz-mat response trailer.

Wildfire

- The BSB County Fire Department has obtained a 1,000-gallon trailer-mounted pump that can be used for firefighting. The trailer has been obtained and is currently being constructed. It will be stationed west of Boulevard Fire Dept.
- BSB OEM has had radio announcements promoting the wildfire season and discussion with community partners on preparedness and mitigation.
- The USFS completed a fuel reduction project in Basin Creek drainage, the BSB water supply, in 2004. The Forest Service is currently completing fuel reduction project along Lime Kiln Rd near the Thompson Park area. The BLM is currently completing fuel reduction project in the Jerry Creek area of the Big Hole.
- Arc GIS is now online and provides BSB OEM with tools when outside the urban area. GIS layers are available online with roads, railroads, and truck routes.

Earthquakes

- BSB and Montana Tech participated in the Great Montana Shakeout for the past two years. Montana Tech had tri-fold display and posters around campus on earthquake awareness. The



BSB school district and OEM exercise on earthquake preparedness last year at Hillcrest Elementary.

- An Ordinance is now in place that requires water heaters to be tied down. County facilities are inspected to ensure there is no illegal stacking.
- MBMG/USGS completed an earthquake scenario that identified critical facilities vulnerable to significant earthquake damage.

Transportation Accidents

- BSB and MDT reduced the speed limit from 80 to 65 mph on I-15 & I-90 through Butte.

Communicable Disease

- The BSB Health Dept. now maintains immunization records for daycare facilities.
- A committee subgroup of the LEPC was formed on Public Health and includes representatives from St. James Healthcare, OEM, MT Tech, BSB Health Department, and the American Red Cross.

Flooding and Dam Failure

- Culvert upgrades to mitigate flooding and maintenance issues included: 10 culverts in 2010, 8 culverts in 2011, 12 culverts in 2012, 8 culverts in 2013, 11 in 2014, and 5 culverts in 2015. During this period 4 bridges were also upgraded.
- In 2012, a Stormwater Management ordinance was passed requiring detention basins at new commercial improvements. The ordinance minimizes increases in stormwater runoff from any development to prevent or reduce flooding, siltation, and stream bank erosion, to protect private property, and to maintain the integrity of stream channels and runoff characteristics of the area.
- Progress has been made on implementing the BSB Stormwater Master Plan. Storm water piping installed in the past several years included: 2010 - Pacific St., Main & Daly Storm, Arizona & Porphyry, Belle & Buffalo; 2011 - Anaconda Road Tunnel, O'Neil St.; 2013 - Buffalo Tunnel, Edison St.; 2014 - Hornet St.; 2015 - Kaw Ave., Earth Moon; 2016 - Woolman, George, Utah. Between 2011 & 2015, approximately 100 storm drain inlets were replaced. Over 6,000 lineal feet of street curb & gutter sections were installed.
- Progress has been made on implementing the stormwater projects in Walkerville including:
 - Main and Daly (2010) - Two new drop inlets, one new manhole and 214 linear feet of 10-inch storm pipe was installed to convey the 25-year, 24-hour storm event. This project was initiated to address plugged storm inlets.
 - O'Neil Street Stormwater and Sanitary Sewer Upgrades (2011). Previous storm water ditches on O'Neill Street were filled in to allow for ADA access to homes which caused surface runoff to flow south to the alley between O'Neill and Bennett Streets. The alley below O'Neill Street was re-graded after a utility upgrade project in 2004 which caused storm water runoff to pool and flow into the basement of 27 E. Bennett Street. A mine tailings cover (cap) project on ARCO property above O'Neill Street rerouted storm water to the property and private road on N. Main Street.
 - Pacific Street; Belle and Buffalo (2010)

- The BSB Planning Dept. now has a permit system and DFIRMs available online. MT DNRC provides technical assistance. There is more public awareness now available and refinancing requirements.
- BSB County has completed the mitigation project to “examine regulations to identify how development can be restricted in areas vulnerable to ice jam hazards on the Big Hole River”. The BSB County Planning Department has established new setback requirements whereby new development must be 100 feet outside the 100-year floodplain.
- In 2015, BSB OEM participated in the MT DES District 1 Montana Monsoon exercise which had a scenario of flooding from BSB to Missoula.

All Hazards

- 2014 Public Outreach Campaign - LEPC members produced 15- to 30- second public service announcements on hazard awareness and preparedness that were broadcast on the radio for 8 months.
- New generators have been obtained for new EOC, Fire Station #1, and St. James Healthcare.
- A new website was developed for the BSB County Office of Emergency Management in 2014. In addition, a website manager was hired and serves as the social media coordinator and public information officer for the county.
- Reserve-911 has been implemented in BSB County since the 2010 PDM Plan was adopted.
- Rural addressing is complete. Driveways have been GPS'd and building footprints collected.
- A subcommittee of the LEPC was formed on sheltering and mass care.

5.2 General Mitigation Planning Approach

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

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

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

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

5.3 Mitigation Goals and Objectives

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

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

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

The 2010 BSB County PDM Plan had eight goals; one goal specific to each of seven hazards (earthquake; extended cold and winter storms; wildfire and structure fire; hazardous material incidents; flooding; terrorism, violence, strikes and civil unrest; and, near-surface ground control failure), and one all-hazard goal. For this 2016 PDM update, the Steering Committee reviewed the mitigation goals and determined that there should be one goal for each hazard profiled in the Plan, and an all-hazard goal.

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.

Mitigation objectives developed for the original PDM Plan were generally revised for this 2016 update. Where appropriate, mitigation objectives reflect FEMA’s “Local Mitigation Planning Handbook, March 2013” guidelines (see Section 5.5.1) as either: Public Education and Awareness, Property Protection, Prevention, Structural, Natural Resource Protection, or Emergency Services. Mitigation goals and objectives for the 2016 Plan are presented in **Table 5.3-1**.

5.4 Capability Assessment

The goals and objectives used to mitigate natural and technological hazards build on the community’s existing capabilities. BSB 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 City-County staff who implement the legal and regulatory requirements used to manage growth (zoning, building codes, subdivision regulations, and floodplain ordinances).

BSB 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 City-County to support hazard mitigation and provide the funding to implement the BSB County mitigation strategy.

Table 5.3-1. Summary of Goals and Objectives

Goal #	Goal Statement	Objective #	2016 Goal/Objective Statement
1	Reduce Impacts from a Hazardous Material Incident	1.1	Develop information/outreach and public education projects to mitigate impacts from hazardous material incidents
		1.2	Implement property protection projects to mitigate impacts from hazardous material incidents
		1.3	Upgrade emergency service capabilities to mitigate impacts from hazardous material incidents
2	Reduce Impacts from Wildfires	2.1	Develop information/outreach and public education projects to mitigate impacts from wildfires
		2.2	Perform property protection projects to mitigate impacts from wildfires
		2.3	Upgrade emergency serviced capabilities to mitigate impacts from wildfires
		2.4	Support regional planning projects to mitigate impacts from wildfires
3	Reduce Impacts from Earthquakes	3.1	Conduct mapping/analysis/planning projects to mitigate impacts from earthquakes
		3.2	Develop information/outreach and public education projects to mitigate impacts from earthquakes
		3.3	Perform property protection activities to mitigate impacts from earthquakes
		3.4	Implement regulatory projects to mitigate impacts from earthquakes
4	Reduce Impacts from Severe Weather	4.1	Develop information/outreach and public education projects to mitigate impacts from severe weather.
5	Reduce Impacts from Transportation Accidents	5.1	Partner with transportation service providers to mitigate impacts from transportation accidents.
6	Reduce Impacts that Communicable Disease has on Public Health	6.1	Develop information/outreach and public education projects to mitigate impacts from Communicable Disease.
7	Minimize Effects of Terrorism, Violence, Strikes, and Civil Unrest	7.1	Conduct mapping/analysis/planning projects to mitigate impacts from Terrorism, Violence and Civil Unrest
		7.2	Enhance emergency service capabilities to mitigate impacts from Terrorism, Civil Unrest, and Violence.
8	Reduce Impacts from Flooding and Dam Failure	8.1	Implement structural projects to mitigate impacts from flooding
		8.2	Develop information/outreach and public education projects to mitigate impacts from flooding
		8.3	Implement regulatory projects to mitigate impacts from flooding
		8.4	Enhance emergency services to mitigate impacts from flooding and dam failure
9	Reduce Impacts from All Hazards	9.1	Obtain capital equipment to mitigate impacts from all hazards
		9.2	Enhance emergency service capabilities to mitigate impacts from all hazards
		9.3	Develop information/outreach and public education projects to mitigate impacts from all hazards

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5.4.1 Summary of Programs and Resources Available to Support Mitigation

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

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 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

BSB 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 City-County's mitigation capabilities. Several of these entities are described below.

Butte-Silver Bow County Office of Emergency Management

The mission of BSB County OEM 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 BSB County OEM Director 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. 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.

BSB County OEM staff include 1.75 full-time staff positions, the director and an accounting specialist, who devote 100 percent of their time to emergency management. These positions are funded 50 percent federal through the Emergency Management Performance Grant (EMPG) program and 50

percent general fund. The BSB OEM has two deputy coordinators who are not compensated for time spent on OEM activities –they just support the OEM as needed.

Local Emergency Planning Committee

The mission of the BSB 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 BSB County. Monthly meetings are held at the EOC in Butte.

BSB Planning Board

The BSB Planning Board provides direction to the Planning Department. Their mission is to sustain and improve the health, safety, convenience and welfare of the citizens of BSB County and to plan for the future development of the community. Planning for the optimum land uses and orderly development of BSB County recognizes: the need for adequate transportation, health, educational and recreational facilities; the needs of agriculture, industry and business as related to future growth; the needs of residential areas to promote and provide healthy surroundings for family life; and, the growth of the community shall be proportionate with and promote the efficient and economical use of public funds.

The Planning Department provides community planning and development services to BSB County. The Department completes a formal review of development proposals for compliance with the community's goals, objectives and policies as identified in the BSB County Growth Policy. The Planning Department is responsible for the administration of several programs including: zoning; subdivision review; floodplain management; historic preservation; reclamation (superfund sites); excavation and dirt moving permits; growth policy development and Implementation; and, transportation planning.

BSB Fire Department

The mission statement of the BSB Fire Department is to provide the highest level of fire protection by means of prevention, suppression, and education. Divisions within the department include: suppression, prevention, training, communications, and maintenance. The BSB Fire Department is composed of a paid fire department and 11 volunteer fire departments. Within BSB, the Fire Department serves the communities of Buxton, Centerville, Divide, Melrose, Ramsay, Rocker, Silver Bow, and, although Walkerville is a separate municipality, assists the community when requested. The volunteer fire departments include Big Butte, Boulevard, Centerville, Floral Park, Home Atherton, Little Basin Creek, Racetrack, Rocker, Terra Verde, Walkerville, and Melrose.

The Fire Department also works in coordination with the Butte-Silver Bow Fire Commission and Fire Advisory Council. Written mutual aid agreements have been signed among and between all fire districts or departments in BSB, as well as with adjoining counties, and similar agreements have been reached with state and federal fire control agencies.

State DNRC and Federal Land Management Agencies

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

- Fire Prevention Program seeks to educate Montanans about fire risk, the wildland urban interface and reducing human-caused fires;
- Fire Training Program provides statewide training opportunities for DNRC and local government personnel;
- Equipment Development Center builds and maintains wildland fire equipment and radio communications;
- Fire Support Programs provide financial and technical expertise to assist all fire programs in meeting their respective goals and mandates. These include, but not limited to: Fire Assessment fees, GIS, repair and maintenance of radio systems and rolling stock equipment.

The US Forest Service and BLM are involved in planning activities for public land area within BSB County.

Headwaters Resource Conservation & Development (RC&D)

Headwaters RC&D is an economic development organization serving southwest Montana including BSB County. Appendix D of their Comprehensive Economic Development Strategy outlines their Disaster and Economic Recovery and Resiliency Strategy, as summarized below.

In the event of a disaster, Headwaters is committed to: providing local officials, business leaders and other community partners with access to regional demographic, economic and hazard vulnerability data; developing technical expertise and economic analysis tools for conducting initial disaster assessments and long-term economic impact analysis; establishing collaborative relationships with local government officials and non-government organizations that may provide data, funding, technical expertise and other resources essential to intermediate and long-term economic recovery following a disaster event; offering grant writing expertise and technical assistance to regional and local entities, both for pre-disaster resiliency initiatives as well as post-disaster recovery efforts; establishing familiarity with traditional economic and community recovery funding sources, including resources for business development assistance programs, such as the Economic Development Administration's Revolving Loan Fund programs as well as private, nonprofit and philanthropic resources; providing technical support to impacted businesses; encouraging concepts and principles of economic resiliency strategies into the existing planning and development plans and activities within the region; leveraging assets; and, offering a neutral forum to convene diverse stakeholders and facilitate discussion and planning initiatives around the issues of economic resiliency preparedness and recovery.

5.4.3 Fiscal Capabilities

Mitigation projects and initiatives are largely or entirely dependent on available funding. BSB 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 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 BSB County and the Town of Walkerville.

5.5.1 Mitigation Strategy Update and Reconciliation

The Steering Committee reviewed the list of mitigation actions (projects) from the 2010 PDM Plan and determined which were complete, should be deleted, or reworded for the 2016 mitigation strategy during Steering Committee conference calls held during February and March, 2016. **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 Steering Committee 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 2016 BSB 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 Steering Committee 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 Steering Committee reviewed the projects and assigned a corresponding city-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 Steering Committee 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 Director of the BSB County OEM will be responsible for mitigation project administration.

Table 5.5-2. Butte-Silver Bow County 2016 Mitigation Strategy

Goal	Objective	Project	Hazard	Jurisdiction	Benefit-Cost Ranking/Score	County Priority
Goal 1 – Reduce Impacts of a Hazardous Material Incident	Objective 1.1 - Develop information/outreach and public education projects to mitigate impacts from hazardous material incidents	Project 1.1.1 - Educate teachers and school staff in schools near hazardous materials facilities and transportation routes in how to limit exposure to hazardous materials to students during an incident.	Hazardous Material Incidents	BSB County	Medium/16	High
	Objective 1.2 - Implement property protection projects to mitigate impacts from hazardous material incidents	Project 1.2.1 - Encourage owners to install perimeter security fencing at bulk chemical and petroleum facilities.	Hazardous Material Incidents	BSB County	Medium/14	Low
	Objective 1.3 - Upgrade emergency service capabilities to mitigate impacts from hazardous material incidents	Project 1.3.1 - Ensure local emergency responders have adequate training to respond to hazardous material events consistent with local capabilities.	Hazardous Material Incidents	BSB County/ Walkerville	High/20	High
		Project 1.3.2 - Pursue funding for supplies and equipment trailer.	Hazardous Material Incidents	BSB County/ Walkerville	Medium/16	Medium
		Project 1.3.3 - Invite railroad companies be part of LEPC and do exercises once every two or three years.	Hazardous Material Incidents	BSB County	Medium/14	High
		Project 1.3.4 - Determine whether a regional haz-mat team could be located in BSB County.	Hazardous Material Incidents	BSB County/ Walkerville	Medium/14	Low
	Goal 2 – Reduce Impacts from Wildfires	Objective 2.1 - Develop information/outreach and public education projects to mitigate impacts from wildfires	Project 2.1.1 - Provide outreach to landowners on fuel mitigation funding opportunities for private land.	Wildfire	BSB County/ Walkerville	High/20
Project 2.1.2 - Implement robust public outreach project on FireWise principles.			Wildfire	BSB County/ Walkerville	High/20	High
Objective 2.2 - Perform property protection projects to mitigate impacts from wildfires		Project 2.2.1 - Promote coordination with USFS regarding fuels reduction in the Basin Creek watershed to protect water supply.	Wildfire	BSB County	High/18	High
		Project 2.2.2 - Promote expansion of existing hazardous fuels reduction programs to other wildland-urban interface areas, in particular where future development is planned.	Wildfire	BSB County/ Walkerville	Medium/16	High

Table 5.5-2. Butte-Silver Bow County 2016 Mitigation Strategy

Goal	Objective	Project	Hazard	Jurisdiction	Benefit-Cost Ranking/Score	County Priority
Goal 2 – Reduce Impacts from Wildfires	Objective 2.2 - Perform property protection projects to mitigate impacts from wildfires	Project 2.2.3 - Install dry hydrants through the county as determined necessary by local fire districts.	Wildfire	BSB County/Walkerville	Medium/14	High
Goal 2 – Reduce Impacts from Wildfires	Objective 2.3 - Upgrade emergency service capabilities to mitigate impacts from wildfires	Project 2.3.1 - Obtain attachments to connect fire suppression equipment to rancher's sprinkler systems.	Wildfire	BSB County	Medium/16	Medium
	Objective 2.4 - Support regional planning projects to mitigate impacts from wildfires	Project 2.4.1 - Actively support the Butte Fire Protection Association in expanding a wildland fire management committee consisting of Butte-Silver Bow, State, and Federal departments to coordinate planning, training, prevention, and suppression.	Wildfire	BSB County/Walkerville	High/20	High
		Project 2.4.2 - Integrate GIS technology for multi-jurisdictional response and mitigation planning.	Wildfire	BSB County/Walkerville	Medium/16	High
		Project 2.4.3 - Advocate and promote through statewide associations insurance rate reduction for homeowners who participate in defensible space projects.	Wildfire	BSB County/Walkerville	Medium/12	Medium
		Project 2.4.4 - Support conifer encroachment group and their efforts to do prescribed burning to mitigate wildfire risk.	Wildfire	BSB County/Walkerville	High/18	High
Goal 3 – Reduce Impacts from Earthquakes	Objective 3.1 - Conduct mapping/analysis/planning projects to mitigate impacts from earthquakes	Project 3.1.1 - Encourage MBMG to obtain funding to obtain LiDAR data and conduct a trenching and age dating study along the Continental and Rocker faults to detail their movement history.	Earthquake	BSB County/Walkerville	High/18	Medium
		Project 3.1.2 - Complete study and catalog unreinforced commercial/ institutional/ government masonry buildings in BSB County.	Earthquake	BSB County/Walkerville	High/18	Medium
	Objective 3.2 - Develop information/outreach and public education projects to mitigate impacts from earthquakes	Project 3.2.1 - Provide educational awareness for students and the general public on earthquake safety.	Earthquake	BSB County/Walkerville	High/20	High

Table 5.5-2. Butte-Silver Bow County 2016 Mitigation Strategy

Goal	Objective	Project	Hazard	Jurisdiction	Benefit-Cost Ranking/Score	County Priority
Goal 3 – Reduce Impacts from Earthquakes	Objective 3.3 - Perform property protection activities to mitigate impacts from earthquakes	Project 3.3.1 - Strengthen windows in schools by replacing with shatterproof glass as part of regular maintenance.	Earthquake	BSB County	Medium/14	Medium
		Project 3.3.2 - Tie down/secure objects in critical facilities and schools that could fall during an earthquake.	Earthquake	BSB County/Walkerville	High/18	Medium
		Project 3.3.3 - Perform seismic retrofits of critical facilities and schools vulnerable to earthquake hazard.	Earthquake	BSB County/Walkerville	Medium/12	High
	Objective 3.4 - Implement regulatory projects to mitigate impacts from earthquake	Project 3.4.1 - Implement process whereby building department notifies builders requesting permits of high earthquake risk.	Earthquake	BSB County/Walkerville	Medium/16	High
Goal 4 – Reduce Impacts from Severe Weather	Objective 4.1 - Develop information/outreach and public education projects to mitigate impacts from severe weather	Project 4.1.1 - Host National Weather Service spotter training sessions throughout the county.	Severe Weather	BSB County/Walkerville	High/20	High
		Project 4.1.2 - Promote the National Weather Service's Severe Weather Awareness Weeks.	Severe Weather	BSB County/Walkerville	High/20	Medium
		Project 4.1.3 - Continue participating in National Weather Service's storm ready community program.	Severe Weather	BSB County/Walkerville	High/20	Medium
		Project 4.1.4 - Use social media to publicize winter weather hazards and distribute information in welcome packets to new residents.	Severe Weather	BSB County/Walkerville	Medium/16	Medium
Goal 5 -Reduce Impacts from Transportation Accidents	Objective 5.1 - Partner with transportation service providers to mitigate impacts from transportation accidents	Project 5.1.1 - Encourage railroad to upgrade condition of railroad crossings throughout BSB County and improve signage where needed.	Transportation Accidents	BSB County	Medium/14	High
		Project 5.1.2 - Continue partnering with MDT to identify and rectify areas of concern on highway systems throughout BSB County.	Transportation Accidents	BSB County	Medium/16	High
		Project 5.1.3 - Acquire appropriate equipment to enhance aviation safety.		BSB County	Low/6	Medium
Goal 6 - Reduce Impacts that Communicable Disease has on Public Health	Objective 6.1- Develop information/outreach and public education projects to mitigate impacts from communicable disease.	Project 6.1.1 - Disseminate promotional information on immunizations.	Communicable Disease	BSB County/Walkerville	Medium/16	High
		Project 6.1.2 - Support BSB Health Department's public education programs on communicable disease.	Communicable Disease	BSB County/Walkerville	Medium/14	High



Table 5.5-2. Butte-Silver Bow County 2016 Mitigation Strategy

Goal	Objective	Project	Hazard	Jurisdiction	Benefit-Cost Ranking/Score	County Priority
Goal 6 - Reduce Impacts that Communicable Disease has on Public Health	Objective 6.1- Develop information/outreach and public education projects to mitigate impacts from communicable disease.	Project 6.1.3 - Promote Community Health Committee that is part of LEPC.	Communicable Disease	BSB County/Walkerville	Medium/16	High
Goal 7 – Minimize Impacts of Terrorism, Violence and Civil Unrest	Objective 7.1 - Conduct mapping/analysis/planning projects to mitigate impacts from Terrorism, Violence and Civil Unrest	Project 7.1.1 - Review Crisis Action Plans in all schools, hospitals, and Montana Tech to ensure they include adequate security measures.	Terrorism, Violence, Civil Unrest	BSB County	Medium/14	High
	Objective 7.2 - Enhance emergency service capabilities to mitigate impacts from Terrorism, Violence and Civil Unrest	Project 7.2.1 - Continue awareness and training on active shooters.	Terrorism, Violence, Civil Unrest	BSB County/Walkerville	Medium/14	High
		Project 7.2.2 - Pursue funding for development and implementation of a campaign to educate the public on active shooter response.	Terrorism, Violence, Civil Unrest	BSB County/Walkerville	Medium/12	Medium
Goal 8 – Reduce Impacts from Flooding and Dam Failure	Objective 8.1 - Implement structural projects to mitigate impacts from flooding	Project 8.1.1 - Install culverts in areas where water runoff is problematic.	Flooding	BSB County/Walkerville	Medium/16	High
		Project 8.1.2 - Increase stormwater systems in poor drainage areas.	Flooding	BSB County	Medium/14	High
		Project 8.1.3 - Maintain the existing stormwater infrastructure to mitigate impacts from flash flooding.	Flooding	Walkerville	Medium/14	Medium
	Objective 8.2 - Develop information/outreach and public education projects to mitigate impacts from flooding and dam failure	Project 8.2.1 - Educate the public on the National Flood Insurance Program.	Flooding	BSB County/Walkerville	Medium/14	Medium
		Project 8.2.2 - Educate development community (including surveyors, builders, realtors, and developers) on floodplain building requirements.	Flooding	BSB County/Walkerville	Medium/16	High
		Project 8.2.3 - Monitor process on Yankee Doodle tailings dam permit project and provide public input and outreach as appropriate.	Dam Failure	BSB County/Walkerville	Medium/14	High
		Project 8.2.4 - Consider participation in FEMA's Community Rating System Program.	Flooding	BSB County/Walkerville	Medium/14	Medium

Table 5.5-2. Butte-Silver Bow County 2016 Mitigation Strategy

Goal	Objective	Project	Hazard	Jurisdiction	Benefit-Cost Ranking/Score	County Priority
Goal 8 – Reduce Impacts from Flooding and Dam Failure	Objective 8.3 - Implement regulatory projects to mitigate impacts from flooding and dam failure	Project 8.3.1 - Consider using dam inundation as criteria for future subdivision review and require disclosure by developers to prospective buyers.	Dam Failure	BSB County	Medium/14	Medium
	Objective 8.4 - Enhance emergency services to mitigate impacts from flooding and dam failure.	Project 8.4.1 - Participate in dam exercises on Basin Creek dams with BSB Public Works Dept. and emergency response partners.	Dam Failure	BSB County	High/20	High
Goal 9 - Reduce Impacts from All Hazards	Objective 9.1 - Obtain capital equipment to mitigate impacts from all hazards	Project 9.1.1 - Obtain backup generators for emergency shelters and city/county critical facilities.	All Hazards	BSB County/ Walkerville	Medium/14	High
	Objective 9.2 - Enhance emergency service capabilities to mitigate impacts from all hazards	Project 9.2.1 - Coordinate with Red Cross for mass care and sheltering plan.	All Hazards	BSB County/ Walkerville	Medium/14	High
		Project 9.2.2 - Enhance general public alert, notification and warning capabilities.	All Hazards	BSB County/ Walkerville	High/20	High
	Objective 9.3 - Develop information/outreach and public education projects to mitigate impacts from all hazards	Project 9.3.1 - Educate local government officials in mitigation and readiness for all hazards.	All Hazards	BSB County/ Walkerville	Medium/16	High
		Project 9.3.2 - Provide special needs facilities with guidelines for disaster preparedness measures including pet needs.	All Hazards	BSB County/ Walkerville	Medium/12	High
		Project 9.3.3 - Develop an ad campaign on readiness for evacuation or other emergencies.	All Hazards	BSB County/ Walkerville	Medium/16	High
COMPLETED: Project - Provide capability for multi-agency coordination for incident management by constructing new Emergency Operations Center.						
COMPLETED: Project - Examine regulations to identify how development can be restricted in areas vulnerable to ice jam hazards on the Big Hole River.						
COMPLETED: Project - Obtain trailer-mounted 1,000-gallon pumps (2) which can be used for firefighting.						

Table 5.5-3. Butte-Silver Bow County 2016 Mitigation Strategy – Implementation Details

Project	Jurisdiction	Responsible Agency / Department	Progress Made	Planned Activities	Schedule	Potential Funding Source
HAZARDOUS MATERIAL INCIDENT MITIGATION PROJECTS						
Project 1.1.1 - Educate teachers and school staff in schools near hazardous materials facilities and transportation routes in how to limit exposure to hazardous materials to students during an incident.	BSB County	BSB OEM, School District, BSB Fire & Vol Fire Depts.	No progress to report.	Collect published information and put together an education module. Schedule meeting with school administrators and teachers to present material.	Short-term	City-County Resources
Project 1.2.1 - Encourage owners to install perimeter security fencing at bulk chemical and petroleum facilities.	BSB County	BSB Planning Dept., BSB Fire & Vol Fire Depts.	No progress to report.	Conduct inventory of facilities and determine those which do not have security fencing. Approach owners of and encourage them to install protective measures.	Long-term	City-County Resources, HMEP grants
Project 1.3.1 - Ensure local emergency responders have adequate training to respond to hazardous material events consistent with local capabilities.	BSB County, Walkerville	BSB Fire & Vol Fire Depts.	Completed trainings in accordance with BSB Training and Exercise Plan including 1Q (Oct-Dec) 2015 - Bert Mooney Airport Full Scale Exercise.	Continue same. 2Q (Jan-Mar 2017) - Bert Mooney Airport tabletop exercise. 3Q (Apr-Jun) 2017 - Fire Dept. Haz-Mat Function Exercise (Train Derailments) to include mapping exercise that incorporates terrain and prevailing winds so emergency responders learn how to deal with toxic gases that could cool and settle in low areas.	Ongoing	City-County Resources, HMEP grants
Project 1.3.2 - Pursue funding for supplies and equipment trailer.	BSB County, Walkerville	BSB Fire & Vol Fire Depts.	Arrangements have been made for BSB to get a haz-mat trailer from Missoula.	Get supplies for trailer. Ensure that funding is built into fire dept. budget.	Ongoing	City-County Resources
Project 1.3.3 - Invite railroad companies be part of LEPC and do exercises once every two or three years.	BSB County, Walkerville	BSB OEM, BSB Fire & Vol Fire Depts., Railroads	New project for 2016 PDM Update	Identify community railroad crossings and railroads that go through neighborhoods. Invite railroads to participate in monthly LEPC meetings. Schedule exercise with railroads.	Short-term	City-County Resources
Project 1.3.4 - Determine whether a regional haz-mat team could be located in BSB County.	BSB County, Walkerville	BSB Fire & Vol Fire Depts., BSB OEM	New project for 2016 PDM Update	Make inquiries as to what is needed. Apply for Homeland Security Grant for funding.	Long-term	City-County Resources, HMEP grants

Table 5.5-3. Butte-Silver Bow County 2016 Mitigation Strategy – Implementation Details

Project	Jurisdiction	Responsible Agency / Department	Progress Made	Planned Activities	Schedule	Potential Funding Source
WILDFIRE MITIGATION PROJECTS						
Project 2.1.1 - Provide outreach to landowners on fuel mitigation funding opportunities for private land.	BSB County, Walkerville	BSB Fire Chiefs, BSB PIO, USFS	New project for 2016 PDM Plan	Determine all funding sources for private fuel mitigation. Develop brochure to distribute to landowners in high risk areas. Use broadcast and social media to advertise opportunities.	Short-term	DNRC
Project 2.1.2 - Implement robust public outreach project on FireWise principles.	BSB County, Walkerville	BSB Fire Chiefs, BSB PIO, USFS	New project for 2016 PDM Plan. Have had radio announcements, discussion with community partners.	Obtain published materials on FireWise programs. Distribute at appropriate events. Use broadcast and social media to educate public.	Ongoing	DNRC
Project 2.2.1 - Promote coordination with USFS regarding fuels reduction in the Basin Creek watershed to protect water supply.	BSB County	BSB Council of Commissioners	USFS completed fuel reduction project in Basin Creek drainage in 2004.	USFS looking at other landscape-level projects for implementation.	Long-term	USFS
Project 2.2.2 - Promote expansion of existing hazardous fuels reduction programs to other wildland-urban interface areas, in particular where future development is planned.	BSB County, Walkerville	BSB Fire & Vol. Fire Depts., BSB OEM, BSB Planning Dept., Federal Agencies	USFS currently completing fuel reduction project along Lime Kiln Rd near Thompson Park area. BLM currently completing fuel reduction project in Jerry Creek area of the Big Hole.	USFS/BLM looking at other landscape-level projects for implementation. BSB Planning Dept. will outline where future development is being considered.	Long-term	Government Partnership, Non-Profits
Project 2.2.3 - Install dry hydrants through the county as determined necessary by local fire districts.	BSB County, Walkerville	BSB Fire & Vol. Fire Depts.	Dry hydrants installed in Browns Gulch and Feely Hill areas.	Explore new locations for dry hydrants including: Roosevelt Drive, North Walkerville, Butte Highlands Mine, as well as others.	Ongoing	City-County Resources, Federal Agencies, Private
Project 2.3.1 - Obtain attachments to connect fire suppression equipment to rancher's sprinkler systems.	BSB County	BSB Fire & Vol. Fire Depts.	No progress to report.	Consult with ranchers and determine what equipment is needed. Research costs and funding sources. Make purchase.	Long-term	City-County Resources, Private

Table 5.5-3. Butte-Silver Bow County 2016 Mitigation Strategy – Implementation Details

Project	Jurisdiction	Responsible Agency / Department	Progress Made	Planned Activities	Schedule	Potential Funding Source
Project 2.4.1 - Actively support the Butte Fire Protection Association in expanding a wildland fire management committee consisting of Butte-Silver Bow, State, and Federal departments to coordinate planning, training, prevention, and suppression.	BSB County, Walkerville	BSB Fire & Vol. Depts., DNRC, USFS, BLM, others	The Butte Fire Protection Association disbanded due to lack of need to meet. Recently the partners who originally made up core group got together and had a productive meeting.	Meet at least twice a year and possibly more if necessary in order to keep the lines of communication open.	Ongoing	City-County Resources
Project 2.4.2 - Integrate GIS technology for multi-jurisdictional response and mitigation planning.	BSB County, Walkerville	BSB Fire & Vol. Fire Depts., BSB Planning Dept.	Ongoing project. Arc GIS is now online and provides OEM with tools when outside urban area. GIS layers road/railroads/truck routes available online. Physical addresses have been assigned. Driveways have been GPS'd and building footprints collected.	Implement GIS technology to assist Fire Dept. to map fires and provide accurate info to response personnel. Hire paid person for this purpose and provide training and purchase equipment.	Long-term	City-County Resources
Project 2.4.3 - Advocate and promote through statewide associations insurance rate reduction for homeowners who participate in defensible space projects.	BSB County, Walkerville	BSB Council of Commissioners	Not much progress. Most insurance companies still do not recognize fuel mitigation efforts. More work still needs to be done in this area.	Continue to advocate for change.	Long-term	City-County Resources
Project 2.4.4 - Support conifer encroachment group and their efforts to do prescribed burning to mitigate wildfire risk.	BSB County, Walkerville	USFS, BLM, State, Non-profits	New project for 2016 PDM Plan.	Group is conducting pilot project (Mile-High Conservation District project) in BSB.	Mid-term	DNRC
EARTHQUAKE MITIGATION PROJECTS						
Project 3.1.1 - Encourage MBMG to obtain funding to obtain LiDAR data and conduct a trenching and age dating study along the Continental and Rocker faults to detail their movement history.	BSB County	MBMG	In 2005, MBMG got FEMA planning grant for this project but wasn't allowed to use funding do trenching since it was a "planning" project.	Support MBMG in effort to re-apply for funding for this project.	Mid- to Long-term	Federal, State, City-County Resources, Montana Tech, Private



Table 5.5-3. Butte-Silver Bow County 2016 Mitigation Strategy – Implementation Details

Project	Jurisdiction	Responsible Agency / Department	Progress Made	Planned Activities	Schedule	Potential Funding Source
Project 3.1.2 - Complete study and catalog unreinforced commercial/ institutional/ government masonry buildings in BSB County.	BSB County, Walkerville	BSB Planning Dept., Historic Preservation	Historic Preservation Office has over 4,000 forms organized by street address that indicate construction type.	Review forms and determine which structures are best candidates for structural retrofits to enhance public safety.	Mid-term	City-County Resources, FEMA
Project 3.2.1 - Provide educational awareness for students and the general public on earthquake safety.	BSB County, Walkerville	School Districts, OEM, Planning Dept., Montana Tech	BSB and MT Tech participated in Great American Shakeout for past two years. MT Tech had tri-fold display and posters around campus on earthquake awareness. School district and OEM did exercise on EQ preparedness at Hillcrest Elementary in 2015.	Participate in Great American Shakeout Drill each year. Earthquake planning on BSB training schedule for 2nd Q (Jan-Mar) 2018.	Ongoing	City-County Resources, School District, FEMA
Project 3.3.1 - Strengthen windows in schools by replacing with shatterproof glass as part of regular maintenance.	BSB County, Walkerville	School Districts	No progress to report.	Work with school district and maintenance personnel and select appropriate materials to use for window upgrades.	Long-term	School District, FEMA
Project 3.3.2 - Tie down/secure objects in critical facilities and schools that could fall during an earthquake.	BSB County, Walkerville	BSB Facilities	Ordinance in place that requires water heaters to be tied down. County facilities are inspected to ensure there is no illegal stacking.	Continue same and enhance program county-wide. Conduct inventory of school library shelves, suspended lighting networks, computer labs, and maintenance shelves to determine compliance. Update as necessary.	Ongoing	City-County Resources, FEMA
Project 3.3.3 - Perform seismic retrofits of critical facilities and schools vulnerable to earthquake hazard.	BSB County, Walkerville	BSB Facilities, BSB OEM, School District	MBMG/USGS completed earthquake scenario that identified critical facilities vulnerable to significant earthquake damage.	Select most vulnerable schools and apply to FEMA for funding for seismic retrofits.	Long-term	City-County Resources, School District, FEMA
Project 3.4.1 - Implement process whereby building department notifies builders requesting permits of high earthquake risk.	BSB County, Walkerville	BSB Planning Dept.	No progress to report.	Develop notification protocol and hand-out that can be part of building permit package.	Short-term	City-County Resources

Table 5.5-3. Butte-Silver Bow County 2016 Mitigation Strategy – Implementation Details

Project	Jurisdiction	Responsible Agency / Department	Progress Made	Planned Activities	Schedule	Potential Funding Source
SEVERE WEATHER AND DROUGHT MITIGATION PROJECTS						
Project 4.1.1 - Host National Weather Service spotter training sessions throughout the county.	BSB County, Walkerville	BSB OEM	New Project for 2016	Already doing this. Continue same. Determine date and location to hold another spotter training.	Ongoing	City-County Resources
Project 4.1.2 - Promote the National Weather Service's Severe Weather Awareness Weeks.	BSB County, Walkerville	BSB OEM	New Project for 2016	Have had meetings with NWS. Already doing this. Continue same.	Ongoing	City-County Resources
Project 4.1.3 - Continue participating in National Weather Service's storm ready community program.	BSB County, Walkerville	BSB OEM	New Project for 2016	Have had meetings with NWS. Already doing this. Continue same.	Ongoing	City-County Resources
Project 4.1.4 - Use social media to publicize winter weather hazards and distribute information in welcome packets to new residents.	BSB County, Walkerville	BSB OEM	New Project for 2016	Use Facebook and Twitter during winter months to publicize winter weather hazards. Guidebook has already been prepared. Develop distribution program with Chamber of Commerce.	Short-term	City-County Resources
TRANSPORTATION ACCIDENT MITIGATION PROJECTS						
Project 5.1.1 - Encourage railroad to upgrade condition of railroad crossings throughout BSB County and improve signage where needed.	BSB County	LEPC, Council of Commissioners	New Project for 2016	Identify priority locations (Main, Montana, Utah, Arizona, and others)	Short-term	City-County Resources
Project 5.1.2 - Continue partnering with MDT to identify and rectify areas of concern on highway systems throughout BSB County.	BSB County	BSB Council of Commissioners, Comprehensive Transportation Committee	New Project for 2016. BSB & MDT reduced speed limit from 80 to 65 mph on I-15 & I-90 through Butte.	BSB Comprehensive Transportation Committee to discuss problem areas as needed. Make formal request to MDT.	Ongoing	City-County Resources
Project 5.1.3 - Acquire appropriate equipment to enhance aviation safety.	BSB County	BSB Airport Authority	New project for 2016	Determine equipment needs. Consider drone safety issues. Apply for grants.	Long-term	FAA
COMMUNICABLE DISEASE MITIGATION PROJECTS						
Project 6.1.1 - Disseminate promotional information on immunizations.	BSB County, Walkerville	BSB Health Dept.	New project for 2016. BSB Public Health Dept. now maintains immunization records for daycare facilities.	Already doing this. Continue same. Identify alternate location for immunizations besides Civic Center.	Ongoing	State, City-County Resources

Table 5.5-3. Butte-Silver Bow County 2016 Mitigation Strategy – Implementation Details

Project	Jurisdiction	Responsible Agency / Department	Progress Made	Planned Activities	Schedule	Potential Funding Source
Project 6.1.2 - Support BSB Health Department's public education programs on communicable disease.	BSB County, Walkerville	St. James, BSB OEM, MT Tech, BSB Health Dept., School District, Red Cross	New project for 2016	Distribute reporting guidelines to providers and BSB County on annual basis.	Ongoing	State, City-County Resources
Project 6.1.3 - Promote Community Health Committee that is part of LEPC.	BSB County, Walkerville	St. James, BSB OEM, Montana Tech, BSB Health Dept., School District, Red Cross	New project for 2016. Formed a committee subgroup of LEPC including St. James Healthcare, OEM, MT Tech, Public Health, American Red Cross	Discuss emerging diseases like Ebola, Zika. Meet monthly then quarterly. Provide outreach to physicians and community. Training scheduled for 4th Q (Jul-Sep) 2017 on Public Health and Medical Services function annex in EOP.	Short-term	State, City-County Resources
TERRORISM, VIOLENCE AND CIVIL UNREST MITIGATION PROJECTS						
Project 7.1.1 - Review Crisis Action Plans in all schools, hospitals, and Montana Tech to ensure they include adequate security measures.	BSB County	BSB Law Enforcement, School Districts, Montana Tech, Hospital	Each entity has completed an Emergency Operations Plan.	Review plans and update security measures as appropriate.	Ongoing	City-County Resources, State, Homeland Security
Project 7.2.1 - Continue awareness and training on active shooters.	BSB County, Walkerville	BSB Law Enforcement	New Project for 2016.	Hold weekend seminars with MT National Guard with participation of MT Tech, OEM, and BSB Facilities. Active Shooter exercise planned for 2Q (Jan-Mar) 2017.	Ongoing	City-County Resources, State, Homeland Security
Project 7.2.2 - Pursue funding for development and implementation of a campaign to educate the public on active shooter response.	BSB County, Walkerville	BSB Law Enforcement	New Project for 2016.	Research funding opportunities for training and available active shooter community curriculum.	Mid-term	BSB Law Enforcement
FLOODING AND DAM FAILURE MITIGATION PROJECTS						
Project 8.1.1 - Install culverts in areas where water runoff is problematic.	BSB County, Walkerville	BSB Public Works, Walkerville Public Works	Culvert upgrades for maintenance and to mitigate flooding issues included: 10 in 2010, 8 in 2011, 12 in 2012, 8 in 2013, 11 in 2014, and 5 in 2015. During this period 4 bridges were also upgraded.	For the 2016-2017 period, 12 culverts and 2 bridges are scheduled for upgrade to mitigate flood concerns.	Ongoing	City-County Resources, Superfund (ARCO)



Table 5.5-3. Butte-Silver Bow County 2016 Mitigation Strategy – Implementation Details

Project	Jurisdiction	Responsible Agency / Department	Progress Made	Planned Activities	Schedule	Potential Funding Source
Project 8.1.2 - Increase stormwater systems in poor drainage areas.	BSB County	BSB Public Works	Storm water piping installed in the past several years in BSB and Walkerville. See Section 5.1 for details.	Write a new MS4 Stormwater Management Plan which identifies upgrades and projects to mitigate flooding and reduce contaminant loading to the streams. Consult Master Stormwater Plan to identify and prioritize neighborhoods where there may be inadequate stormwater infrastructure issues.	Ongoing	City-County Resources, Superfund (ARCO)
Project 8.1.3 - Maintain the existing stormwater infrastructure to mitigate impacts from flash flooding.	Walkerville	Walkerville Public Works	New project for 2016.	Monitor the system for locations that could use minor upgrades including pouring aprons to better promote flow into inlets and re-aligning ditches to capture and direct storm water into the system.	Ongoing	Town Resources, Superfund (ARCO)
Project 8.2.1 - Educate the public on the National Flood Insurance Program.	BSB County, Walkerville	BSB Planning Dept.	The BSB Planning Dept. now has a permit system and DFIRMS available online. DNRC provides technical assistance. More public awareness now and refinancing requirements.	Continue same.	Ongoing	City-County Resources, FEMA
Project 8.2.2 - Educate development community (including surveyors, builders, realtors, and developers) on floodplain building requirements.	BSB County, Walkerville	BSB Planning Dept.	With release of new online floodplain maps online there is more awareness of building requirements.	Continue same.	Ongoing	City-County Resources, FEMA
Project 8.2.3 - Monitor process on Yankee Doodle tailings dam permit project and provide public input and outreach as appropriate.	BSB County, Walkerville	BSB Planning Dept., Superfund	New project for 2016.	Monitor progress on permitting process and provide public outreach when appropriate.	Long-term	City-County Resources
Project 8.2.4 - Consider participation in FEMA's Community Rating System Program.	BSB County, Walkerville	BSB Planning Dept.	New project for 2016.	BSB County has plans to apply for CRS standing as a community. The launch date is uncertain at this time.	Mid-term	City-County Resources

Table 5.5-3. Butte-Silver Bow County 2016 Mitigation Strategy – Implementation Details

Project	Jurisdiction	Responsible Agency / Department	Progress Made	Planned Activities	Schedule	Potential Funding Source
Project 8.3.1 - Consider using dam inundation as criteria for future subdivision review and require disclosure by developers to prospective buyers.	BSB County	BSB Planning Dept.	New project for 2016.	Provide dam inundation hazard maps from EAPs or PDM Plan to BSB Planning Dept. to provide to development community, as needed.	Long-term	City-County Resources
Project 8.4.1 - Participate in dam exercises on Basin Creek dams with BSB Public Works Dept. and emergency response partners.	BSB County	BSB OEM, LEPC, BSB Public Works	New project for 2016.	Identify partners who should participate in exercise. Develop scenario. Schedule exercise. Report to LEPC on success.	Short-term	City-County Resources
ALL-HAZARD MITIGATION PROJECTS						
Project 9.1.1 - Obtain backup generators for emergency shelters and city/county critical facilities.	BSB County, Walkerville	BSB OEM	New generators have been obtained for new EOC, Fire Station #1, and St. James Healthcare.	Generators needed for Civic Center, School Dist. warehouse, public health dept.	Ongoing	City-County Resources, GSA, Red Cross, Private
Project 9.2.1 - Coordinate with Red Cross for mass care and sheltering plan.	BSB County, Walkerville	BSB OEM, LEPC	Developed subcommittee of LEPC on sheltering	Review DPHHS sheltering 2020 plan and evaluate for BSB. Reduce number of shelters.	Short-term	City-County Resources, Red Cross, Private
Project 9.2.2 - Enhance general public alert, notification and warning capabilities.	BSB County, Walkerville	911 Dispatch, BSB OEM	R-911 completed.	Apply for homeland security grants for courthouse project.	Ongoing	City-County Resources, State
Project 9.3.1 - Educate local government officials in mitigation and readiness for all hazards.	BSB County, Walkerville	BSB OEM	Have done this on a limited basis but plan to expand outreach to include all hazards.	Planning a senior management education drill to include commissioners, dept. heads, and chief executive.	Short-term	City-County Resources, FEMA
Project 9.3.2 - Provide special needs facilities with guidelines for disaster preparedness measures including pet needs.	BSB County, Walkerville	BSB OEM, Office of Developmental Disabilities	During 2014 when PSA campaign underway, a PSA was made and broadcast targeting the special needs population.	BSB Developmental Disabled director will develop guidebook and present to LEPC for review. Distribute guidebook at events.	Ongoing	City-County Resources, State, Red Cross, Private
Project 9.3.3 - Develop an ad campaign on readiness for evacuation or other emergencies.	BSB County, Walkerville	BSB OEM	New project for 2016	Check with FEMA and determine whether material is available on this topic. Make and broadcast PSA announcements.	Ongoing	City-County Resources
Notes: ARCO = Atlantic Richfield Company; BLM = Bureau of Land Management; BSB = Butte-Silver Bow; DFIRM = Digital Flood Insurance Rate Map; DNRC = Montana Department of Natural Resources and Conservation; FEMA = Federal Emergency Management Agency; FIRM = Flood Insurance Rate Map; GIS = Geographic Information System; HMEP=Hazardous Material Emergency Preparedness; LEPC = Local Emergency Planning Committee; MBMG = Montana Bureau of Mines and Geology; MDT = Montana Dept. of Transportation; NWS = National Weather Service; OEM = Office of Emergency Management; PDM = Pre-Disaster Mitigation; PIO = Public Information Officer; USFS = United States Forest Service; USGS = United States Geological Survey.						



SECTION 6. PLAN MAINTENANCE PROCEDURES

The plan maintenance section details the formal process that will ensure that the BSB 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 BSB County will monitor the progress of mitigation activities and be incorporated into existing planning mechanisms. The final section describes how the BSB 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 monitored and evaluated a number of times since it was updated in 2010. The entire Plan was reviewed biannually and hazard priorities and mitigation projects were discussed as needed. It was determined that the hazardous material incident and wildfire hazards should be elevated in priority in the 2016 PDM Plan ahead of the earthquake hazard because they occur more routinely. The LEPC felt that it was more realistic to have the hazards that are more common as the top two hazards. Mitigation projects completed during this period are shown in *Section 5.1*.

6.1.2 2016 PDM Plan

The updated 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 Director of the BSB County Office of Emergency Management 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 OEM Director 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 (2021) 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 BSB County OEM Director may decide to apply for a planning grant through FEMA to start the 2021 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 2016 PDM Plan Update.

The BSB County OEM Director 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 BSB Chief Executive and Council of Commissioners and Walkerville Town Council for adoption. The OEM Director 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 BSB County and Walkerville Town departments, emergency response entities, local businesses, and non-profit organizations 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 BSB 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 BSB County OEM Director 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 BSB Fire Department monitors wildfire projects; and, BSB Public Works Department monitors bridge and culvert projects, and infrastructure projects within the Walkerville town limits. In addition to completed projects from the 2010 PDM Plan, the BSB County Comprehensive Emergency Management Plan was updated in 2011 and hazard-specific annexes were reviewed and revised.

6.2.2 2016 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 (2021). 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 OEM Director and any National Fire Plan projects or Community Assessment Agreements will be monitored by the BSB Fire Department, U.S. Forest Service, BLM 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

BSB 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	BSB County Comprehensive Emergency Management Plan	Integrated by reference in PDM Plan.
	Emergency Action Plan, Basin Creek Dams	Dam failure mitigation projects should be integrated in EAPs when these documents are revised.
	Emergency Action Plan, Yankee Doodle Tailings Dam	
Growth Policies	BSB County Growth Policy, 2008	Integration of mitigation strategies will occur when growth policies are revised.
	Central Butte Neighborhood Plan, 2010	
	Greely Neighborhood Plan, 2010	
Wildfire Mitigation	Community Wildfire Protection Plan, 2005	Wildfire mitigation projects will be incorporated when plan is revised.
Economic Development	Southwestern Montana Comprehensive Economic Development Strategy 2012-2017	Integration of mitigation strategies will occur, as appropriate, when plans are revised.
	Uptown Butte Urban Renewal Plan, 2014	
Transportation	BSB Transportation Plan, 2005	Mitigation projects associated with Transportation Accident hazard to be integrated during plan revision
Severe Weather	BSB Urban Forest Plan, 2013	Mitigation projects associated with tree maintenance will be integrated during plan revision.
Codes, Regulations & Ordinances		
Zoning	BSB County Zoning Regulations	Mitigation projects will be incorporated into revisions of zoning ordinances.
Subdivisions	BSB County Subdivision Regulations, 2009	Mitigation projects will be incorporated into revisions of subdivision regulations.
Floodplain	BSB County Floodplain and Floodway Management Regulations	Flood mitigation projects will be incorporated into revisions of floodplain regulations.
Stormwater	BSB County Stormwater Management Plan and Ordinance	Mitigation projects associated with stormwater management will be integrated when Stormwater Management Plan is updated.

BSB County uses a Growth Policy to guide development. The Town of Walkerville is included in this document and does not have an independent growth policy. 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 BSB County, job descriptions of various staff will be enhanced to include a mitigation component. The job descriptions of BSB Planning Director will be augmented to include involvement in the LEPC. Participation in this group will provide an awareness of new and on-going mitigation initiatives for the purpose that they be integrated into plans, codes and regulations during revision. The job description of the GIS Manager, 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 OEM Director will include responsibilities for implementing outreach activities for risk reduction in the County, coordinating with the Chief Executive and Council of Commissioners to secure funding for mitigation projects, ensure mitigation projects are implemented, and updating the PDM Plan. The OEM Director 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 Council of Commissioners will provide an opportunity for the BSB County OEM Director to report back on the progress made on the integration of mitigation planning elements into City-County planning documents and procedures.

6.4 Continued Public Involvement

Butte-Silver Bow 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 BSB County and Town of Walkerville offices. An electronic copy of the plan will be available on the BSB County website. The existence and location of plan hard copies will be publicized on the BSB County website. *Section 2.0* includes the address and the phone number of the BSB County OEM Director 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 OEM Director 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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