

**Town of Bearcreek  
Town of Bridger  
Town of Fromberg  
Town of Joliet  
City of Red Lodge  
Carbon County, Montana**

## **PRE-DISASTER MITIGATION AND COMMUNITY WILDFIRE PROTECTION PLAN**



Town of Joliet, May 2011

***Prepared by Carbon County Disaster and Emergency Services  
with assistance from***

**Beck Consulting  
Map Murals  
AMEC Environment and Infrastructure, Inc.**

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## **CHAPTER I: INTRODUCTION**

### **Authority**

Carbon County intends to remain a disaster resistant community by revising and implementing this Pre-Disaster Mitigation/Community Wildfire Protection Plan. The plan identifies mitigation measures to be taken, guides the expenditure of funds, and raises awareness about the importance of taking personal and collective (public and private) action to prevent and prepare for reasonably for seeable natural disasters. The plan has been prepared utilizing funds supplied by the Federal Emergency Management Agency through Montana Disaster and Emergency Services supplemented by county match. The plan meets the requirements of the Interim Final Rule published in the Federal Register on February 26, 2003, at 44 CFR Part 201 as part of the Disaster Mitigation Act of 2000. The participating jurisdictions are the same as the 2005 plan, the towns of Bearcreek, Bridger, Fromberg, Joliet, the city of Red Lodge, and Carbon County.

### **Project Area**

The project area for this plan is Carbon County, Montana. The county is located in south central Montana and includes approximately 1,313,859 acres or 2,048.79 square miles. According to the 2010 census, the county is home to 10,078 people. There are five incorporated communities within the county. The countywide population increased 5.5% from 2000 to 2010. The population density of the county in 2010 was 4.9 people per square mile. (<http://quickfacts.census.gov>) Carbon County is bordered by Park, Big Horn, Yellowstone, and Stillwater Counties in Montana, and Park and Big Horn Counties in Wyoming.

### **Land Use**

The county has tremendous diversity in elevation, topography, vegetation, and precipitation. Granite Peak, Montana's highest peak at 12,799 feet above sea level is situated on the western county boundary. By contrast, the lowest point in the county, in the northeast corner, has an elevation of only 3,300 feet. Approximately 55% of the land in the county (704,000 acres) is in private ownership, much of this in agricultural production. The size of the holdings of the remaining 45% of the land in the county is owned in descending order by the Forest Service, Bureau of Land Management, State of Montana, National Park Service, and U.S. Fish and Wildlife Service.

Public and private lands throughout the county are used in livestock (beef cattle and sheep) and hay production, both dryland and irrigated hay. The county produces sugar beets, wheat, barley, oats, dry beans, and corn. According to the 2007 Montana Agricultural Statistics—the most recent year for which farm information is available-- Carbon County had 715 farms averaging 1,110 acres each for a total of 793,628 acres in farms. The median size farm was 200 acres suggesting a great diversity in farm size across the county with many smaller farm operations. The market value of agricultural products in the county in 2007 was \$45,265,000. ([www.agcensus.usda.gov](http://www.agcensus.usda.gov))

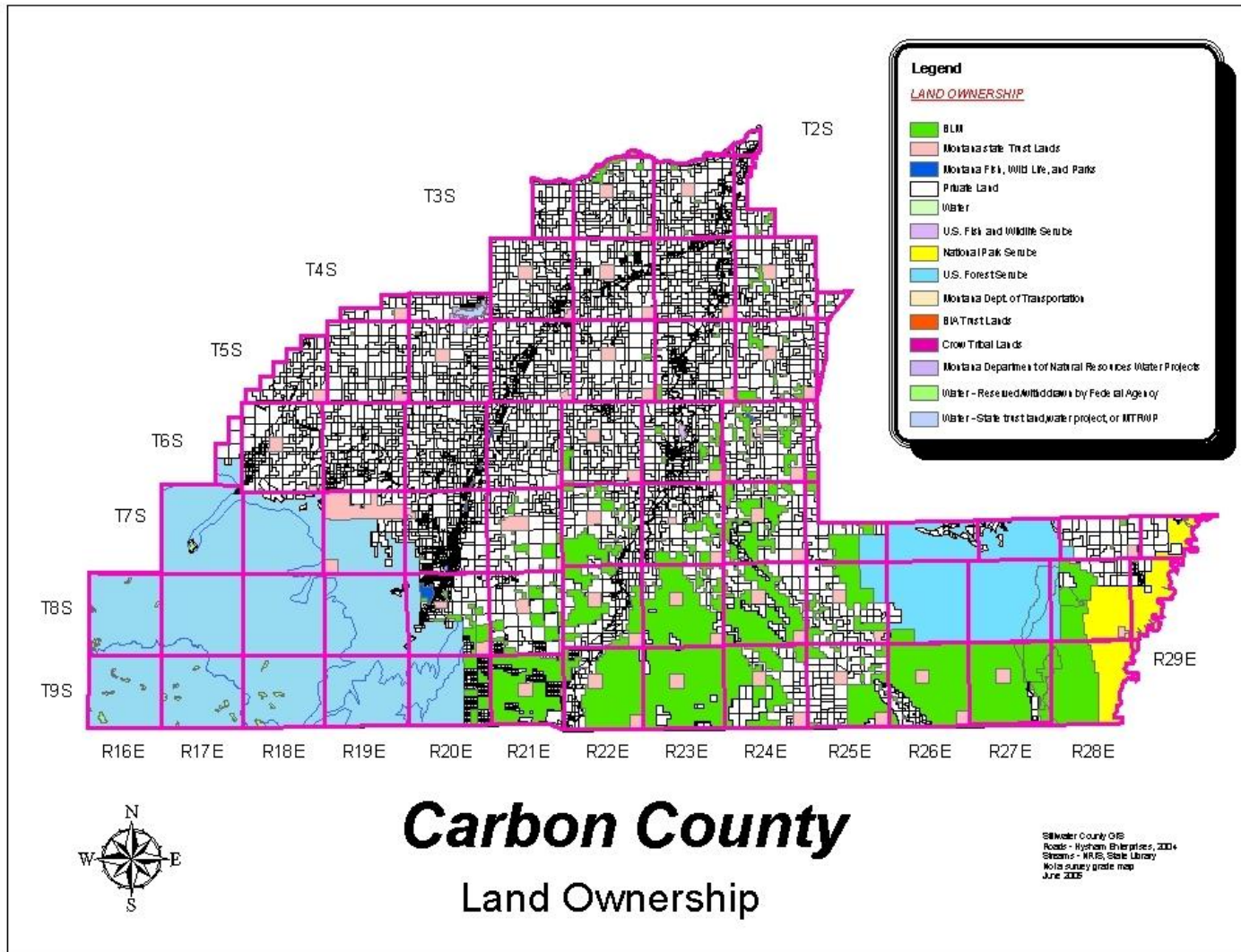


Figure 1.1

Public lands are primarily situated in the higher elevation Beartooth Mountains on the west side of the county, the Pryor Mountains on the east, and in the south central area of the county. Public lands are undeveloped with the exception of mineral production, recreational facilities, and dispersed range improvements. National Forest lands in the western portions of the county abut private lands, some with residences, creating wildland-urban interface areas with potential for wildland fire.

The county contains five incorporated communities, Red Lodge, the county seat, Bearcreek, Bridger, Fromberg, and Joliet. There are also a number of unincorporated communities including; Belfry, Boyd, Edgar, Luther, Roberts, Rockvale, Roscoe, and Silesia. Approximately forty-five percent of the population resides within the incorporated communities. Developed areas of the county cover about 1200 acres. The county had 6,441 housing units in 2010 with a home ownership rate of 75.7%.

Transportation infrastructure in the form of railroads, state highways, and state bridges is concentrated in these two valley bottoms. County roads and bridges also move traffic across the valley bottoms and from the valley bottoms to the foothills and bench areas. Other than the residential development associated with individual subdivisions--mostly in the southwestern area of the county, there are no major developments of land proposed outside of existing communities. Carbon County has some small-scale manufacturing, but no major concentrated manufacturing or industrial areas.

Carbon County has no county-wide zoning. The county has a Growth Policy and subdivision regulations. Development permits are required when a change of land use is proposed. The city of Red Lodge also has a growth policy and zoning ordinance.



Carbon County Commissioners Prinkki, Tucker and Grewell (left to right.)

## Climate and Weather

The Nobel Prize-winning Intergovernmental Panel on Climate Change (IPCC) issued a special report on global warming and extreme weather on November 18, 2011. “This is the first time the group of scientists has focused on the dangers of extreme weather: events such as heat waves, floods, drought and storms. Those are more dangerous than gradual increases in the world’s average temperature.” (Billings Gazette, November 19, 2011) IPCC lead writer, Chris Field, of Stanford University said scientists aren’t sure which weather disaster will be the biggest threat because wild weather interacts with economics and where people live. “It’s clear losses from disasters are increasing,” Field said. The report said it is “virtually certain that heat waves are getting worse, longer and hotter, while cold spells are easing.” According to the report, there is a 2-in-3 chance that heavy downpours will increase, both in the tropics and northern regions..” (Billings Gazette, November 19, 2011)

“Carbon County has a continental climate, modified by the pattern and contours of the mountains, valleys, and plains” according to the USDA Soil Survey, Carbon County Area, Montana, 1975.

Consistent with the variation in elevation and topography across the county, precipitation ranges from over 70 to less than 6 inches annually. The heaviest precipitation occurs in the southwestern area of the county at higher elevations and much of the precipitation falls in the form of snow. The driest area of the county is situated just north of the Wyoming border, south of Belfry, in the south central portion of the county. (Beartooth RC&D Project, 1970) According to the Soil Survey, “The Belfry section of the Clarks Fork Valley, in the rain shadow of the very high mountains, is probably the driest section of Montana.”

In the winter, the precipitation falls as snow which accumulates in the foothills and mountains but generally melts off in the lower elevations in the central and northern portions of the county. Snowpack melting contributes to sustained runoff along all major streams. “Occasionally, heavy rains in late May or June coincides with periods of peak runoff, and about 1 year in 10 this combination causes some stream overflow.” (Soil Survey, Carbon County Area, Montana, 1975) Exceptionally heavy snowpack in the winter of 2010-2011 caused high runoff and widespread flooding across the county.

The range in temperatures is also fairly large. Four weather stations located at Belfry, Bridger, Joliet, and Red Lodge monitor temperatures in the county. Monthly extreme averages have ranged from 20.0 degrees Fahrenheit in Belfry in January of 1974, to 70.5 degrees Fahrenheit in Bridger in July of 1933. The frost-free season at Red Lodge is about 104 days, but along the Yellowstone River on the northern edge of the county it can extend to 130 days. Carbon County is also situated so that it experiences Chinook winds which can drive winter temperatures upwards dramatically in a short period of time. Chinook winds can reach 75 miles per hour. Carbon County has experienced extreme weather in all four seasons, from blizzards to rainstorms to hail to tornadoes.

## **Regional Economy**

The largest employment category in the Carbon County economy is that of services and professional workers. This is followed by the farm and agricultural services, and government categories. A small percentage of workers in the county are employed in the construction, manufacturing, and mining employment categories. The top 10 private employers in the county in 2009 were Beartooth Billings Clinic and Health Center, Red Lodge Mountain Resort, Red Lodge Pizza Company, Cedarwood Villa, Rock Creek Resort, Bank of Bridger, the Pollard Hotel, Buckeye Bar, Beartooth Market, and Beartooth Industries. The two largest employers, Beartooth Billings Clinic and Red Lodge Mountain Resort are size class 6 enterprises with between 100 and 249 employees. The majority of the businesses in the county are very small. Per capita income in the county in 2009 was \$35,821, higher than the state average of \$34,004, lower than the national average of \$39,138. (Montana Department of Labor and Industry, Quarterly Census of Employment and Wages, 2009.)

Most of the jobs in the county are held by county residents, but county residents also commute to jobs in Yellowstone and Stillwater Counties. Consistent with Montana as a whole, many residents of Carbon County hold one or more part-time jobs. According to the U.S. Bureau of Labor Statistics unemployment in the county was between 6.0-7.9% from October 2010 – September 2011. For comparison, the state unemployment rate in October 2011 was 7.6%. Transfer payments (for example, retirement and government payments) as opposed to wages from employment make up a large share of the income of county residents.

The proximity of Carbon County to Billings, Montana's largest city means that goods and services are procured by Carbon County residents in Yellowstone County as well as in Carbon County.

## **Development Trends**

*(the following information is based on an interview with Carbon County Planner/Sanitarian, Greg McGann, on December 1, 2011 and public input)*

Since the preparation of the original PDM plan in 2005, there have been a number of major construction projects. The Yellowstone Dog Sports Canine Event Center was completed in 2011. The 26,000-square foot arena is located north of Fox along Highway 212. This facility will serve as a multi-purpose events center and has 19 rooms, a motel license, and 14 RV hook-ups. Red Lodge has a two year-old high school, two new medical clinics (St.Vincents and Billings Clinic), and a one-year old hospital. The Willows assisted living facility was completed and opened adjacent to Beartooth Billings Clinic in Red Lodge in the spring of 2012.

In addition to these building construction projects, the Montana Department of Transportation has largely completed the planning for two major highway projects, Red Lodge North, and Laurel to Rockvale on Highway 212. The Red Lodge North project

will require two floodplain permits for Rock Creek just within the northern city limits of Red Lodge.

The Laurel to Rockvale project will be above any floodplains. This project is located in the north end of Carbon County and will cause changes in traffic patterns. Additional residential development may occur after the project is completed since the trip to Billings (for commuters, shoppers, medical needs, etc.) will be shorter. There may be commercial development along the new corridor, nothing has yet been proposed.

Montana Department of Transportation has also initiated a major road reconstruction project south of Bridger on Highway 72. Most of the work on this first project occurred during the summer of 2011, and the project is scheduled for completion in 2012. A second project on Highway 72 starting at Belfry and extending north towards the first project was been scheduled for award in the spring of 2012 with construction slated to begin in 2013.

The county was also selected to receive funding and technical assistance from the Federal Highway Administration for the West Fork/Ski Run Road. This project will reconstruct the West Fork Road from Highway 212 on the south edge of Red Lodge to its intersection with Ski Run Road. The road currently serves as the only ingress and egress to the West Fork of Rock Creek—an area with high recreation traffic located in the wildland urban interface. The reconstruction is scheduled to occur in 2013.

The north end of the county has seen fairly steady, if slow, growth. The economy in Billings has been relatively robust for these economic times because of its diversity and its proximity to the Bakken energy play in eastern Montana. Jobs with the oil refinery in Laurel, the Burlington Northern Santa Fe Railroad, and Stillwater Mine all contribute to the economy in Carbon County and support residential growth in the north end of the county. This growth stretches all the way south to Joliet which serves to a small degree as a bedroom community for Billings workers who prefer a more rural environment or smaller schools. There has been discussion by property owners surrounding Joliet of developing a subdivision with moderately-priced homes, but this has not proceeded.

The town of Bridger is also home to some Yellowstone County commuters. A 25-lot major subdivision near Bridger was under discussion, but perhaps due to the slowed economy, there has not been an application submitted to the county for this subdivision.

The county is currently experiencing very little subdivision activity. County planner, McGann reports mostly one and two-lot minor subdivisions and no major subdivision this calendar year. Applications the previous several years have been for 10-lot or smaller subdivisions. Aging infrastructure in the smaller communities may be a deterrent to future growth.

McGann reported that there have been 55 septic permits issued for the county from January 1 to December 1, 2011. A relatively larger percentage of the permits issued over the past several years are for replacement/repair, rather than new construction. As shown by the table below, septic permit activity is now half of what it was five years ago.

Table 1.1 Septic Permit Activity

Year	Replacement/Repair	New systems	Total # Permits
2011	20	35	55
2010	14	39	53
2009	15	42	57
2008			59
2007	17	81	98
2006	19	92	111

Source: Carbon County Health and Planning Department

Forrest Sanderson, Director of Community Development for the city of Red Lodge reported that residential development is “non-existent” at the present time, consisting only of remodeling and repair work. One new restaurant opened recently and two additional commercial applications are anticipated, one for a warehouse and the second for a gas station.

### Scope and Plan Organization

This plan is organized into six chapters.

- Chapter I. Introduction

This chapter provides background material to put the plan and mitigation strategies in context.

- Chapter II. Planning Process

This chapter describes how the plan was developed including public involvement. Chapter II also identifies the local plans that were reviewed in the preparation of this update to the PDM and CWPP.

- Chapter III. Hazard Evaluation and Risk Assessment

This chapter gives information about historical disaster occurrences in the county then lists potential hazards, hazard profiles, critical facilities, and vulnerabilities. Chapter III also provides information about asset values.

- Chapter IV. Mitigation Strategy



This chapter takes the hazard information and develops goals, objectives and projects that can be accomplished to lessen the chances and/or severity of a potential disaster. Recognizing the limitation of resources to accomplish all projects identified, Chapter IV also provides the priorities for the projects.

- Chapter V. Community Wildfire Protection and Mitigation

This chapter is organized into two major sections. The first section offers an assessment of wildfire risks, hazards, and values to be protected. It summarizes the county's capabilities to offer protection. The second section lays out the mitigation strategy, specifically the goals and objectives, and how the county has prioritized those goals and objectives.

- Chapter VI. Plan Maintenance

This chapter describes how this plan is to be kept current, how the public will be involved in plan updates, and how other local plans can incorporate goals and projects from this plan.

- Supporting materials such as meeting notes and agendas, and values for critical local government infrastructure can be found in the appendices.

## **CHAPTER II: PLANNING PROCESS**

### **Specific Jurisdictions Represented in the Plan**

The jurisdictions represented in this plan are Carbon County, the city of Red Lodge, and the towns of Bearcreek, Bridger, Fromberg, and Joliet, Montana. These are the same six jurisdictions that participated in and adopted the original PDM/CWPP plan in 2005. There are no new or non-participating jurisdictions for the plan.

### **How the Jurisdictions Participated in the Plan Update**

The six local jurisdictions participated in the planning process. Participation occurred in the following ways:

- By providing key staff to participate in the LEPC and other meetings,
- By identifying actions taken on projects from the 2006 plan,
- By providing information on critical infrastructure and facilities,
- By providing existing plans and documents,
- By meeting with the contractor one-on-one as requested,
- By providing specific mitigation project ideas,
- By reviewing and commenting on the draft plan, and
- By adopting the plan.

### **Opportunity for Involvement by Other Interests**

The Wyoming county adjacent to Carbon County, Park County, was notified that Carbon County was undertaking a revision to the PDM plan and invited to provide input, comments, and review the draft plan.

Because Carbon County borders other Montana counties, Big Horn, Park, Stillwater, and Yellowstone Counties in Montana were notified about the project and invited to participate as they wished. Notification was done by phone and/or e-mail and included the current status of the update, where to find more information on the project, and contact information for questions and input.

There are no higher education facilities located in the county. Local non-profits, businesses, and other organizations had opportunity to learn about and become involved in the process through articles in the Carbon County News and on the county's website. Contractor, Ms. Beck provided the project briefing paper to the director of the Red Lodge Area Chamber of Commerce and offered to answer any questions.

## Individuals/Groups Involved in the Plan Update Process

The following individuals and organizations were invited to participate in plan update.

- County Commissioners
- Town and City mayors/councilors
- Town and Rural Fire Chiefs
- Emergency Medical Services
- Public Health
- Law Enforcement
- Emergency Management
- BBCH Hospital
- Bureau of Land Management
- Public Works Depts
- Chamber of Commerce
- Local Emergency Planning Committee (LEPC)
- Montana DES
- Montana DNRC
- Red Cross
- USDA Forest Service



Carbon County LEPC working meeting January 17, 2012

## Process Followed to Update the Plan

The process followed to update the plan had a number of steps. The county recognized the importance of updating the plan. The county applied for and received a planning grant and also committed resources to meet the local match requirements.

With that grant and a local match, Carbon County along with Big Horn County requested bids and then retained a hazard mitigation planner, Beck Consulting of Red

Lodge, Montana. Beck Consulting subcontracted the GIS and map work to Map Murals also located in Red Lodge, and the hazard profile updates to AMEC Earth and Infrastructure in Lakewood, CO.

To kick-off the project, the contractor met with the Carbon County Disaster and Emergency Services Coordinator and his Deputy Coordinator, the undersheriff. The two contractors from Red Lodge and these two coordinators went through the project list from the 2005 to determine what has been accomplished, what is ongoing, and which projects have had no activity.

The Coordinator determined with concurrence from the contractors that using the existing LEPC as the planning team for the PDM plan would be most effective. The Coordinator who is also the county fire warden, determined that using the Carbon County Council of Fire Chiefs would be most effective for the update of the CWPP portion of the PDM plan.

Membership of the LEPC is provided in Appendix A. The membership includes all three of the county commissioners. Each of the three commissioners attended one or more LEPC meetings where the PDM plan was discussed. The full membership received notice of all LEPC meetings. Meeting notes in Appendix A list the participants present at each LEPC meeting. Membership of the Fire Council is provided in Appendix A as well.

The contractors met with the LEPC in November 2011. At this first meeting, Beck explained what a Pre-Disaster Mitigation plan is and why the county was revising its plan. She also went over the roles of various participants in the process including elected officials, the contractors, the coordinator, the LEPC, the public, Montana Disaster and Emergency Services, and the Federal Emergency Management Agency (FEMA.) Contractor Beck provided a Briefing Paper to be used for general information about the project. The briefing paper contained contact information and the county's web address. The paper was handed out at all meetings during the process. The entire LEPC group revisited and validated the list of hazards from the existing plan. The group was also re-oriented to the goals and projects in the existing plan.

At the second LEPC meeting in January 2012, contractors Beck and Kohley worked with the LEPC to develop problem statements and then identify potential mitigation to address those problems. The mitigation measures identified then became the preliminary projects in the plan in addition to the projects from the 2005 plan that were carried over.

Before finalizing the project list in the draft plan, the contractor and the coordinator determined that it was critical to get input from the elected officials in the county. During the month of February 2012, Ms. Beck asked to be placed on the agendas of the

city and town councils and that of the county commissioners. She met with the Bearcreek, Bridger, Fromberg, and Joliet town councils, and the county commissioners during February. Ms. Beck also met with the Public Works and Emergency Services council committees for the city of Red Lodge. The purposes of these meetings were three-fold, 1) to brief the elected officials and their staff on the PDM/CWPP plan update, 2) to solicit project ideas from them, and 3) to give the local publics the chance to learn and ask questions about the plan update. Meeting agendas and documentation can be found in Appendix B. The county commissioners were briefed on February 27 and all projects under the county's jurisdiction were reviewed with them and edited as per their suggestions.

Following the meetings with the local governing bodies, the contractors presented the non-fire mitigation actions to the LEPC, and then in early April held two public meetings to present the draft plan. The meetings were held in Red Lodge at the Fire/Rescue Hall on April 2 and in Bridger at the Bridger Town Hall on April 3. The two towns were selected as the largest communities in each of the two major valleys. The public meetings were noticed in the Carbon County News and announced at the LEPC meeting on March 20.

Update of Chapter 5 (the CWPP) was completed using a parallel process because of the specific expertise needed. Contractor, Tom Kohley updated the hazard profile for wildland fire. The two local contractors, Kohley and Beck met with the Carbon County Council of Fire Chiefs in Edgar on January 19, 2012. At that meeting, the chiefs and the contractors reviewed the list of projects from 2005, noted the status of each project, and revised the project list to include additional projects. The membership of the fire chief's council changed very little since the preparation of the original plan and most present were familiar with the plan and had participated in its development.

Following this meeting, the contractors updated the information in the wildland fire hazard profile and developed an updated methodology for delineating the wildland urban interface areas in the county. The contractors met with the county commissioners and county fire warden to explain the new WUI delineation. After ensuring the commissioners were comfortable with the WUI as designated, the contractors presented the new WUI methodology and areas to the county Fire Chief's Council in Bridger on April 19, 2012. The Fire Chiefs and fire warden concurred with this methodology and the results and also approved the revised list of projects. The chiefs were provided an electronic copy of the updated draft plan for a four-week comment period.

## Plans Consulted

Once the plan update was initiated, AMEC went to work updating the hazard profiles. The update of the hazard profiles required consultation with a variety of local plans and documents, state plans (2010 Montana State Multi-Hazard Mitigation Plan), and national data bases and tools. Local plans consulted are listed in Table 2.1. Other sources consulted are cited in the appropriate text, and include but are not limited to:

- HAZUS
- SHELDUS
- FEMA NFIP
- U.S. Census data
- National Climate Data Center
- National Drought Mitigation Center
- Montana Bureau of Mines and Geology
- Montana Dam Safety Bureau
- National Dam Inventory
- NOAA Storm Prediction Center
- National Weather Service
- Natural Resources Conservation Service
- Farm Service Agency
- Montana Department of Transportation
- U.S. Departments of Transportation
- Gallatin National Forest Avalanche Center
- U.S. Army Corp of Engineers (CRREL)
- U.S. Geological Survey
- Bureau of Land Management

**Table 2.1 Local Planning Documents Consulted**

Date	Name	Type	Comments
2010	Carbon County Emergency Operations Plan	Emergency Response	Serves as the coordinating and policy document for disasters and emergencies. Covers all 6 local jurisdictions. Plan has 7 goals, does not have projects. References the 2005 PDM and CWPP and lists the natural hazards from the PDM plan. Hazard specific annexes list earthquake, flood, hazmat, severe weather, and wildland fire as natural hazards. Continuity of Government Annex suggests a <i>tabletop exercise to respond to the loss of the county courthouse or county administration building.</i>
2009	Carbon County Growth Policy	Land Use	Purpose of the Growth Policy is to guide decisions about land use. Plan has five goals. Goal 2, Objective 6 is to <i>continue to administer the floodplain program</i> . Goal 4 has projects that include <i>continuation of the Disaster and Emergency Services program and updating the Community Wildfire Protection plan</i> . State statutes require that the subdivision review process disclose potential effects on the natural environment and public health and safety (including natural hazards.)
2009	Carbon County Subdivision Regulations	Land Use	General provisions states that the regulations are intended to promote and provide for a number of items including “avoidance of danger or injury by reason of natural hazards...” Various appendices address the natural environment, lands unsuitable for subdivision, floodplain provisions, drainage facilities, fire protection, and mobile home park standards.
2011	Cooney Dam Emergency Action Plan	EAP	Contains notification flow chart. Mentions flood, earthquake, landslide, sabotage, and other types of incidents. Dam breach analysis and inundation maps. States that <i>DNRC will provide training to dam operator, local citizens, sheriff and deputies, and game warden upon request.</i>
2011	Glacier Lake Emergency Action Plan	EAP	Purpose: to provide maximum early warning to affected persons and minimize or eliminate danger to people or property downstream. Contains notification flow chart. Mentions flood, earthquake, landslide, sabotage, and other types of incidents.
2001	Red Lodge Growth Policy	Land Use	Plan is superceded by the 2008 Red Lodge Growth Policy, but this earlier plans discusses areas for future development.
2008	Red Lodge Growth Policy	Land Use	Addresses development runoff management, participation in the NFIP, “The city’s program of corrective and preventative measures for reducing future flood damage takes a variety of forms including zoning, subdivision, building requirements, and special-purpose floodplain ordinances.” The FIRM at the time of the Growth Policy was dated 1981. FEMA has now produced preliminary DFIRMs. <i>Chapter 14 is about wildland urban interface and contains numerous project ideas that may be appropriate for incorporation in this 2011 CWPP update.</i>
2010	Red Lodge Zoning Ordinance	Zoning Code	Article 4.5 Standards of General Applicability address hillside development, environmental regulations (subsidence and setbacks from Rock Creek), and storm water management and erosion control. Potential natural hazards with the city are addressed.
1995	West Fork Evacuation Plan	Emergency Evacuation	Plan to evacuate the West Fork of Rock Creek west of Red Lodge. Area is in the WUI, includes several subdivisions and the ski area, and has only one means of ingress and egress. Plan contains templates for evac orders and other aids and has been used to evacuate during wildland fire incidents.

Note: Potential project ideas are italicized.

## **Existing Policies, Programs, and Resources**

Carbon County has six incorporated jurisdictions, the county, one city, and four towns. Each of these jurisdictions has a relatively small population and very limited resources in terms of policy and staff.

The plans and regulations listed in Table 2.1 above display the existing regulatory framework for the jurisdictions. Carbon County and the city of Red Lodge are the only jurisdictions to have land use plans. Red Lodge has a fairly extensive zoning code and paid staff for code enforcement. The other communities have minimal municipal codes focused primarily on nuisances and compatible uses. The emergency operations plan for the county covers all of the communities, as does this multi-jurisdictional PDM plan and community wildfire protection plan.

The county has one part-time planner, the city has one fulltime planner. None of the other jurisdictions has a planner. The county planner works with these communities as requested and his time allows. The county planner is also the floodplain administrator and sanitarian. Each community has paid staff responsible for public works, and a police chief. Each community has a volunteer fire chief with the exception of Red Lodge which has a part-time paid fire chief. All of the jurisdictions rely upon the county Disaster and Emergency Services Coordinator for emergency coordination and response. The county's EOP describes emergency response resources in the county which are primarily volunteers. The county also has a Local Emergency Planning Committee or LEPC. The LEPC is currently going through a review to better clarify its roles and responsibilities.

## **How the Local Planning Team (LEPC and Fire Chiefs) Reviewed and Analyzed the Existing Plan**

The goals, list of hazards, and list of mitigation actions (projects) in the 2005 PDM/CWPP were deemed to be the important sections of the plan for close scrutiny by the LEPC and Council of Fire Chiefs. The contractors reviewed those sections with the two groups to determine the project status as either ongoing, completed, partially completed, still needed, and/or no longer necessary. The descriptions of many of the original projects were vague and not deemed to have continued relevancy. The status of projects from the 2005 plan is documented in Appendix D.

The contractors presented and reviewed other sections of the plan during the various LEPC meetings—including the hazard profiles and development trends. LEPC members, Fire Chiefs, and county commissioners were asked to help identify and provide other plans that needed review as part of the PDM update.



## **How the Public Was Involved in the Update Process**

News releases announcing meetings were provided to the newspaper in the county—the Carbon County News. The paper also printed the county commissioners' agendas. Town and city council meetings were noticed in town and city buildings and local post offices. Posters were put up for the public meetings.

Numerous town, city, and county staff such as planners, building inspectors, public works directors, police, fire and emergency medical personnel, and town and city clerks were contacted and interviewed both to explain the process and to request information and project ideas for their jurisdictions. The project briefing paper was posted on the county's website. The draft plan was also available on the county website.

Hard copies of the draft plan were made available at the five town/city halls, county courthouse, and libraries in Bridger, Red Lodge, and Joliet. The plan was posted on the county's website. The public comment period was open from April 1 through May 12, 2012. The availability of the draft plan was announced in the local newspaper.

A small number of comments were received. The comments related to corrections for the names of two facilities—the new hospital and new dog sports arena, adding information on transportation projects (Highway 72 and the West Fork of Rock Creek) to the development trends section, deleting an unnecessary project for the town of Bridger, and updating a name on the LEPC contact list. All suggested changes were made.

## **Plan Review and Approval**

Following the close of the comment period, all edits were completed. The document was finalized. The Plan Review Tool denoting the location in the plan where FEMA's requirements had been met was prepared along with sample resolutions of adoption. The plan was sent to Montana DES for review the third week in May 2012. Following approval by Montana DES, the plan was forwarded to FEMA for review and approval. The plan was deemed "approvable" by FEMA. Once the plan was deemed approvable by FEMA the local jurisdictions were able to formally adopt the plan.

## **Integrating the Requirements into Other Planning Processes**

Carbon County and the city of Red Lodge are the only local jurisdictions that have land use plans. Carbon County's plan (growth policy) was recently updated. The city of Red Lodge has indicated that it will be updating its growth policy in the next two years. The hazard mitigation planner met with both the Emergency Services and Public Works city council committees to gather input. The public works director was present at the Public Works Committee meeting. The hazard mitigation planner interviewed the city's development director.

## CHAPTER III: Hazard Evaluation and Risk Assessment

### Methodology

During the creation of the 2005 Plan, research to develop the historic occurrences of natural disasters in Carbon County was conducted using a number of sources. Over 25 long-time residents from all over the County were contacted and interviewed about their recollections. These recollections were then cross-referenced with early newspaper accounts found in the Carbon County Journal, the Carbon County News, the Joliet Journal, and the Bridger Times. The Carbon County Historical Society and Museum archive files of significant events were checked.

In 2005, it was pointed out that the long-time residents of Carbon County are quite hardy and resourceful. This hardiness was evidenced during the numerous interviews which yielded little in the way of substantive information. Despite the fact that there have been many small-scale and some larger disasters recorded in the County, most of those interviewed were unable to recall incidents which they would classify as disasters. Major winter storms, floods, and drought were simply considered events that one should routinely expect and respond to with the resources at hand and a minimum of agitation and excitement.

In 2005, State and federal databases were searched for weather, earthquake, volcano, avalanche and other information. Finally, local experts at the Montana Department of Transportation, the Deputy State Fire Warden, Montana Bureau of Mines and Geology, the National Weather Service, Natural Resources Conservation Service, the Gallatin National Forest Avalanche Center, the Custer National Forest, BLM, and other local, state, and federal agencies were contacted and interviewed.

For the 2012 Plan Update, details of natural hazard events that affected Carbon County from 2005 to 2011 were sourced from the NCDC (National Climactic Data Center) and from SHELDUS (the Spatial Hazards Events and Losses Database for the United States) databases. Additionally, research of local news coverage of natural hazards that occurred since 2005 was performed, and integrated into the past occurrences section of each hazard profile. For this update, the Human and Animal Disease hazard was eliminated. This hazard was dropped by the planning team due to the fact that public health has received a grant and is now doing their own emergency response and mitigation planning, and planning for animal disease incidents is handled by the Departments of Livestock and Fish, Wildlife and Parks.

The list of hazards profiled in this plan include:

- Avalanche
- Dam Failure
- Drought
- Earthquake
- Earth Movement
- Flood
- Hazardous Materials
- Hail, Severe Thunderstorm, Wind
- Winter Storm
- Tornado
- Volcano
- Wildland Fires

During the 2011 Plan update process, new methodologies were included to update and enhance the risk assessment. Availability of preliminary Digital Flood Insurance Rate Maps enabled a GIS-based risk analysis of the flood hazard. The earthquake profile was updated with a vulnerability assessment based on HAZUS-MH, FEMA's loss estimation software, to better quantify the risk. Where localized data about past occurrences is available that has been used otherwise county-wide information is used.

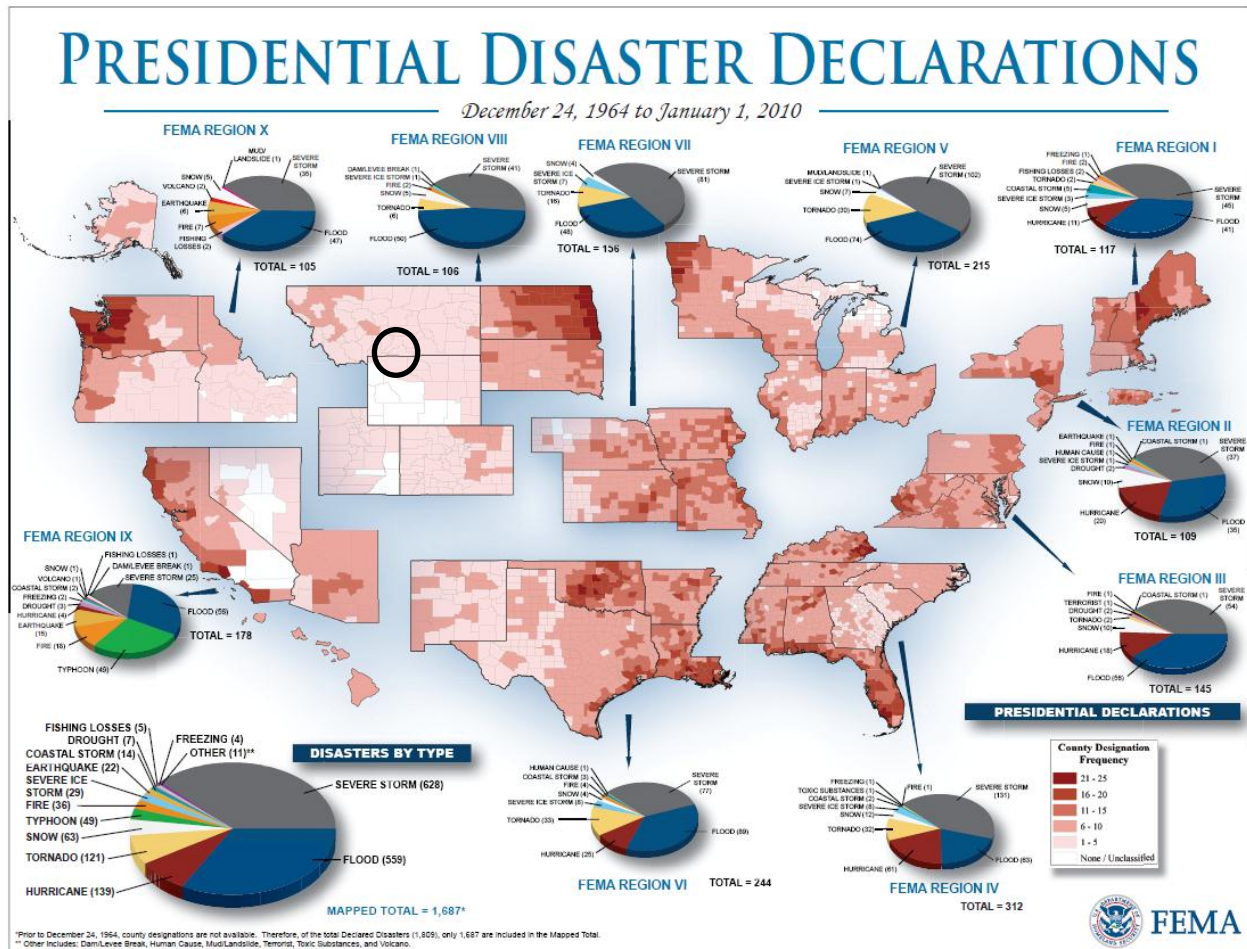
### **Disaster Declaration History**

One method the LEPC used to identify hazards was the researching of past events that triggered federal and/or state emergency or disaster declarations in the planning area. Federal and/or state disaster declarations may be granted when the severity and magnitude of an event surpasses the ability of the local government to respond and recover. Disaster assistance is supplemental and sequential. When the local government's capacity has been surpassed, a state disaster declaration may be issued, allowing for the provision of state assistance. Should the disaster be so severe that both the local and state governments' capacities are exceeded, a federal emergency or disaster declaration may be issued allowing for the provision of federal assistance.

The federal government may issue a disaster declaration through FEMA, the U.S. Department of Agriculture (USDA), and/or the Small Business Administration (SBA). FEMA also issues emergency declarations, which are more limited in scope and without the long-term federal recovery programs of major disaster declarations. The quantity and types of damage are the determining factors.

Figure 3.1, from the FEMA website, displays the number of Presidential (FEMA) Disaster Declarations from 1964 to 2010 by FEMA Region. Carbon County and the State of Montana are located in Region VIII.

Figure 3.1. Presidential Disaster Declarations, December 24, 1964 – January 1, 2010



Source: FEMA

Based on the disaster declaration history provided in Table 3.21, Carbon County is among the many areas in Montana susceptible to disaster. Details on federal disaster declarations were obtained by the LEPC from FEMA and compiled in chronological order in Table 3.2. A review of federal declared disasters indicates that Carbon County received four federal disaster declarations between 1953 and 2010. 2 disaster declarations were a result of severe storms and flooding, one of the disaster declarations resulted from wildfire, and 1 resulted from the Hurricane Katrina evacuations in 2005.

This disaster history suggests that Carbon County sustains a major event worthy of a disaster declaration every 14.5 years. Every declaration resulted directly or indirectly from severe weather. Similarly, most disaster-related injuries to people and damage to property resulted from severe weather conditions.

**Table 3.1. Carbon County Disaster Declarations, 1953-2010**

Disaster Declaration	Hazard Type	Declaration Date	Declaring Agency	Damage*
DR-558	Severe Storms & Flooding	5/29/1978	Federal	\$18,869,924
DR-1183	Severe Storms, Ice Jams, Snow Melt	7/25/1997	Federal	\$11,280,710
DR-1340	Wildfires	8/30/2000	Federal	\$4,959,125
EM-3253	Hurricane Katrina Evacuation	9/13/2005	Federal	\$178,446

Source: PERI

\* In 2009 dollars. Dollar damage values are for all Counties in the disaster declaration.

### Carbon County Severe Weather Summary

“Although severe storms are not common, hailstorms, high winds, heavy snows, freezing rain and sleet, and small tornadoes have been observed at intervals of several years somewhere in the Carbon County Area.” (Carbon County Soil Survey, USDA, 1975)

Severe weather is generally any destructive weather event, but usually occurs in Carbon County as localized storms that bring heavy rain, hail, lightning, strong winds, and tornadoes.

The National Oceanic and Atmospheric Administration’s National Climatic Data Center (NCDC) has been tracking severe weather since 1950. Their Storm Events Database contains data on the following: all weather events from 1993 to current (except from 6/1993-7/1993); and additional data from the National Hurricane Center. This database contains 144 severe weather events that occurred in Carbon County between January 1, 1950 and August 31, 2011. Table 3.2 summarizes these events.

**Table 3.2. NCDC Severe Weather Reports for Carbon County 1950-2011**

Type	# of Events	Property Loss	Crop Loss	Deaths	Injuries
Blizzard	2	\$0	\$0	0	0
Drought	1	\$0	\$0	0	0
Flash Flood	5	\$0	\$0	0	0
Flood	3	\$1,600,000	\$0	1	0
Forest Fires	1	\$5,000,000	\$500,000	0	0
Hail	72	\$0	\$0	0	0
Heavy Rain	12	\$0	\$0	0	0
Heavy Snow	8	\$0	\$0	0	0
High Wind	7	\$0	\$0	0	0
Lightning	1	\$0	\$0	1	0
Thunderstorm Winds	19	\$553,000	\$0	0	0

Type	# of Events	Property Loss	Crop Loss	Deaths	Injuries
Tornado	3	\$12,000	\$0	0	0
Urban/Small Stream Flood	1	\$0	\$0	0	0
Wildfire	2	\$5,525,000	\$0	0	0
Winter Storm	7	\$0	\$0	0	0
<b>Total</b>	<b>144</b>	<b>\$12,690,000.00</b>	<b>\$500,000.00</b>	<b>2</b>	<b>0</b>

Source: National Climatic Data Center Storm Events Database, [www4.ncdc.noaa.gov/cgi-win/wwcgl.dll?wwEvent~Storms](http://www4.ncdc.noaa.gov/cgi-win/wwcgl.dll?wwEvent~Storms)

The LEPC supplemented NCDC data with data from SHELDUS (Spatial Hazard Events and Losses Database for the United States). SHELDUS is a county-level data set for the United States that tracks 18 types of natural hazard events along with associated property and crop losses, injuries, and fatalities for the period 1960-2005. Produced by the Hazards Research Lab at the University of South Carolina, this database combines information from several sources (including the NCDC). From 1960 to 1995, only those events that generated more than \$50,000 in damage were included in the database. For events that covered multiple counties, the dollar losses, deaths, and injuries were equally divided among the affected counties (e.g., if four counties were affected, then a quarter of the dollar losses, injuries, and deaths were attributed to each county). From 1995 to 2010 all events that were reported by the NCDC with a specific dollar amount are included in SHELDUS.

SHELDUS contains information on 248 severe weather events that occurred in Carbon County between 1960 and 2010. Table 3.3 summarizes these events.

**Table 3.3. SHELDUS Severe Weather Reports for Carbon County, 1960-2010\***

Type	# of Events	Property Loss	Crop Loss	Deaths	Injuries
Avalanche	1	\$0	\$0	0	0
Flooding	4	\$26,197.71	\$19,230.77	0	0
Flooding - Severe Storm/Thunder Storm	1	\$1,923.08	\$0	0	0
Hail	2	\$5,000	\$0	0	0
Hail - Severe Storm/Thunder Storm	2	\$1,272.16	\$0	0	0
Hail - Severe Storm/Thunder Storm - Wind	3	\$50,231.38	\$63,563.83	0	0
Hail - Wind	5	\$20,757.62	\$21,831.49	0	0
Landslide	1	\$13,550,000.00	\$0	0	0
Lightning	5	\$50.88	\$208.33	1	4
Severe Storm/Thunder Storm - Wind	5	\$3,720.23	\$0	1	1.07
Severe Storm/Thunder Storm - Winter Weather	2	\$6,203.01	\$3,834.59	0	0
Tornado	1	\$12,000	\$0	0	0

Type	# of Events	Property Loss	Crop Loss	Deaths	Injuries
Wildfire	3	\$542,543.86	\$877.19	0	0
Wind	21	\$263,796.47	\$820.67	0	8.77
Wind - Winter Weather	6	\$89,223.53	\$71.43	0.04	0.04
Winter Weather	14	\$13,0672.72	\$3,742.69	1	0
<b>Total</b>	<b>76</b>	<b>\$14,703,592.65</b>	<b>\$114,180.99</b>	<b>3.04</b>	<b>13.88</b>

Source: SHELDUS, Hazards Research Lab, University of South Carolina, [www.sheldus.org/](http://www.sheldus.org/)

\*Events may have occurred over multiple counties, so damage may represent only a fraction of the total event damage and may be not specific to Carbon County

The following hazard profiles cover all natural hazards identified at the first Steering Committee/Public meeting regardless of the priority they were assigned. The potential loss estimates at the end of this chapter were generated only for the top priority hazards, addressing both natural and person-related hazards.

## Avalanche

An avalanche is simply a mass of snow sliding down a steep slope. The vast majority of avalanches occur during and shortly after winter storms. Avalanches occur when loading of new snow increases stress at a rate faster than strength develops, and the slope fails. Critical stresses develop more quickly on steeper slopes and where deposition of wind-transported snow is common. The combination of steep slopes, abundant snow, weather, snowpack, and an impetus to cause movement create an avalanching episode. About 90 percent of all avalanches start on slopes of 30-45 degrees, and that increases to about 98 percent in the slope range of 25-50 degrees. Avalanches release most often on slopes above timberline that face away from prevailing winds (leeward slopes collect snow blowing from the windward sides of ridges). Avalanches can also run on small slopes well below timberline, such as gullies, road cuts, and small openings in the trees. Very dense trees can anchor the snow to steep slopes and prevent avalanches from starting; however, avalanches can release and travel through a moderately dense forest. An average-sized avalanche travels around 80 mph; the typical range of impact pressure from an avalanche is from 0.5 to 5.0 tons per square foot.

The complex interaction of weather and terrain factors contributes to the location, size, and timing of avalanches. In the absence of detailed scientific observation, any accumulation of snow on a slope steeper than 20 degrees should be considered a potential avalanche hazard.

The most certain sign of avalanche hazard is avalanche activity. Usually when one slope is hazardous, many of the nearby slopes are also hazardous. The historical record shows numerous cases where rescue parties searching for avalanche victims themselves become victims of the same avalanche cycle.



## Historic occurrences

Neither the NCDC nor the Gallatin National Forest Avalanche Center track historical avalanche events and no other data base could be found. Carbon County Search and Rescue periodically responds to avalanche incidents where skiers have triggered an avalanche on Beartooth Pass. The Carbon County News reported on May 3, 1973, that an avalanche knocked a youth half a mile off Vista Point on Beartooth Pass with a wall of snow eight feet high and twelve feet wide. An avalanche on the Forest Service's Hell Roaring Plateau Road in 2002 severely damaged a bridge and closed the road to vehicle traffic. Although the foundation remained in place, the decking was swept down drainage. The bridge was replaced in 2005 for a contracted amount of \$24,430 that included removal of the old decking and replacement of the superstructure and signing. (B.Christiansen, Custer National Forest Engineering) The SHEL DUS database recorded one entry for avalanches in Carbon County between January 1, 1960 and December 31, 2010. A January 3, 2010 avalanche was recorded, but no damages, injuries, or fatalities were attributed to this avalanche. According to the Gallatin National Forest Avalanche Center website:

This avalanche was triggered from a skier ascending an adjacent ridge. The slide was on the ESE of Yellow Mountain on a 34 degree slope. The crown was 18 inches deep and ran on facets putting debris 700-1000 feet down the slope. This is shown on Figure 3.2.

**Figure 3.2. Yellow Mountain Avalanche**



Source: Gallatin National Forest Avalanche Center - <http://www.mtavalanche.com/images/10/yellow-mountain-avalanche>



## Likelihood of Future Occurrence

Due to the topography and high elevations of the western portion of the County, avalanches are likely to occur in the future during the winter months, or during The spring with late season snowfall. Avalanches that affect roads or persons happen less frequently, roughly once every 10 years.

## Vulnerability

Carbon County is vulnerable to avalanches, however, most winters the vulnerability is limited to several areas of the County, specifically the higher elevation public lands in the southwest. During the winter and spring months, individual and small groups of recreational skiers and snowmobile riders are exposed to avalanche danger primarily up the Lake and West Forks of Rock Creek, on areas accessed from the Beartooth Highway, and on areas out of bounds of the Red Lodge Mountain ski area. Montana Department of Transportation employees who clear snow from the road in the spring are also exposed to avalanche danger. Avalanches do occur along the Beartooth Highway, but the highway is closed to the public during these periods. Most of the avalanches that release in the County do not affect people and none of the communities in the County are situated in avalanche paths.

## **Dam Failure**

Dams are man-made structures built for a variety of uses including flood protection, power generation, agriculture, water supply, and recreation. When dams are constructed for flood protection, they are usually engineered to withstand a flood with a computed risk of occurrence. For example, a dam may be designed to contain a flood at a location on a stream that has a certain probability of occurring in any one year. If prolonged periods of rainfall and flooding occur that exceed the design requirements, that structure may be overtopped and fail. Overtopping is the primary cause of earthen dam failure in the United States.

Dam failures can also result from any one or a combination of the following causes:

- Earthquake;
- Inadequate spillway capacity resulting in excess overtopping flows;
- Internal erosion caused by embankment or foundation leakage, or piping or rodent activity;
- Improper design;
- Improper maintenance;
- Negligent operation; and/or
- Failure of upstream dams on the same waterway.

Water released by a failed dam generates tremendous energy and can cause a flood that is catastrophic to life and property. A catastrophic dam failure could challenge local response capabilities and require evacuations to save lives. Impacts to life safety will depend on the warning time and the resources available to notify and evacuate the

public. Major loss of life could result as well as potentially catastrophic effects to roads, bridges, and homes. Electric generating facilities and transmission lines could also be damaged and affect life support systems in communities outside the immediate hazard area. Associated water supply, water quality and health concerns could also be an issue. Factors that influence the potential severity of a full or partial dam failure are the amount of water impounded; the density, type, and value of development and infrastructure located downstream; and the speed of failure.

In general, there are three types of dams: concrete arch or hydraulic fill, earth and rockfill, and concrete gravity. Each type of dam has different failure characteristics. A concrete arch or hydraulic fill dam can fail almost instantaneously; the flood wave builds up rapidly to a peak then gradually declines. An earth-rockfill dam fails gradually due to erosion of the breach; a flood wave will build gradually to a peak and then decline until the reservoir is empty. And, a concrete gravity dam can fail instantaneously or gradually with a corresponding buildup and decline of the flood wave.

Dams and reservoirs have been built throughout Montana to supply water for agriculture and domestic use, to allow for flood control, as a source of hydroelectric power, and to serve as recreational facilities. The storage capacities of these reservoirs range from a few thousand acre feet to nineteen million acre-feet.

Dam failures are usually associated with intense rainfall or prolonged flood conditions, but can occur during an earthquake. Dam failure may be caused by faulty design, construction and operational inadequacies, intentional breaches, or a flood event larger than the design flood. The greatest threat from dam failure is to people and property in areas immediately below the dam since flood discharges decrease as the flood wave moves downstream.

Dam failure floods in Montana have primarily been associated with riverine and flash flooding. The potential for a major flood occurring solely as a result of dam failure due to structural problems is also a possibility.

Aging infrastructure is often to blame for a number of failed dams in Montana. There have been numerous small failures primarily related to deterioration of corrugated metal pipe outlet works, which causes slow release of reservoir contents along the outside of the outlet pipe, with minimal downstream property damage but serious damage to the structure

Dams are rated as high, significant, and low hazard. Hazard determinations are based upon the consequences of dam failure, not the condition, probability, or risk of failure. According to FEMA (2004), dams are classified into one of three categories, as outlined below.”

- **Low Hazard Potential** - Dams 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 where failure or mis-operation results in no probable loss of human life but can cause economic loss, environment 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 where failure/mis-operation will probably cause loss of human life.

According to the Montana Dam Safety Bureau there are a total of 14 dams in Carbon County. Of these, 11 are privately-owned and 3 are state-owned. All of the private dams are low hazard, no dams are significant hazard, and the 3 state-owned dams (as shown in Table 3.4), Glacier Lake, Glacier Lake South, and Cooney Reservoir, are high hazard. Emergency Operations Plans have been prepared by the Department of Natural Resources and Conservation for Glacier Lake, Glacier Lake South, and Cooney Reservoir. These plans are periodically updated and are housed in the Disaster Emergency Coordination office.

**Table 3.4. Carbon County High and Significant Hazard Dams**

Dam Name	Hazard Class	EAP	Owner	Dam Type	Dam Height	Storage (acre feet)*	Stream	Nearest Community
Cooney	High	Y	State of Montana DNRC, WRD	Earth	97	24,195	Red Lodge Creek	Joliet 12 miles
Glacier Lake	High	Y	State of Montana	Concrete	65	4,980	Rock Creek	N/A
Glacier Lake South	High	Y	State of Montana DNRC, WRD	Rockfill	20	2,850	Rock Creek	Red Lodge, 30 miles

Source: National Performance of Dams Program

**Figure 3.3. Cooney Dam Inundation Area**



Source: Montana Department of Natural Resource Conservation GIS (<http://dnrc.mt.gov/GIS/HighHazardDams/>)

Failure of the Mystic Lake Dam regulated by the Federal Energy Regulatory Commission and located in neighboring Stillwater County has the potential to flood a very small portion of the western edge of Carbon County. If the dam were to fail, no structures in Carbon County would be affected. Mystic Lake Dam is a high hazard dam.

### Historic occurrences

There have been no major dam failures in Carbon County. During the springs of 2005 and 2011, precipitation and runoff events created a full pool at Cooney Reservoir. The emergency spillway was utilized and no damage occurred.

### Likelihood of Future Occurrences

The County remains at risk to dam failures from the three high hazard dams that protect the County and surrounding areas. Given the density of population and property, and the age and condition of these dams, the potential exists for catastrophic dam failure in

the County. The three high hazard dams in the County are regulated by the State and the State gives the county a high risk rating.

### Vulnerability

Numerous factors contribute to determining dam vulnerability including: design standards; construction, operation and maintenance; intense rainfall or prolonged flood conditions; and/or earthquakes. The vulnerability of property and population downstream of dams is related to construction in inundation areas.

The Dam Safety Act required that owners of all high and significant hazard dams prepare Emergency Action Plans (EAP). The objectives of the EAP is to pre-plan the coordination of necessary actions by the dam owner and the responsible local and state emergency management officials; identify conditions which could lead to dam failure in order to initiate emergency measures that could prevent or minimize the loss of life or property; and, provide timely notification of a warning of a dam emergency and evacuation in the event of potential failure of the dam.

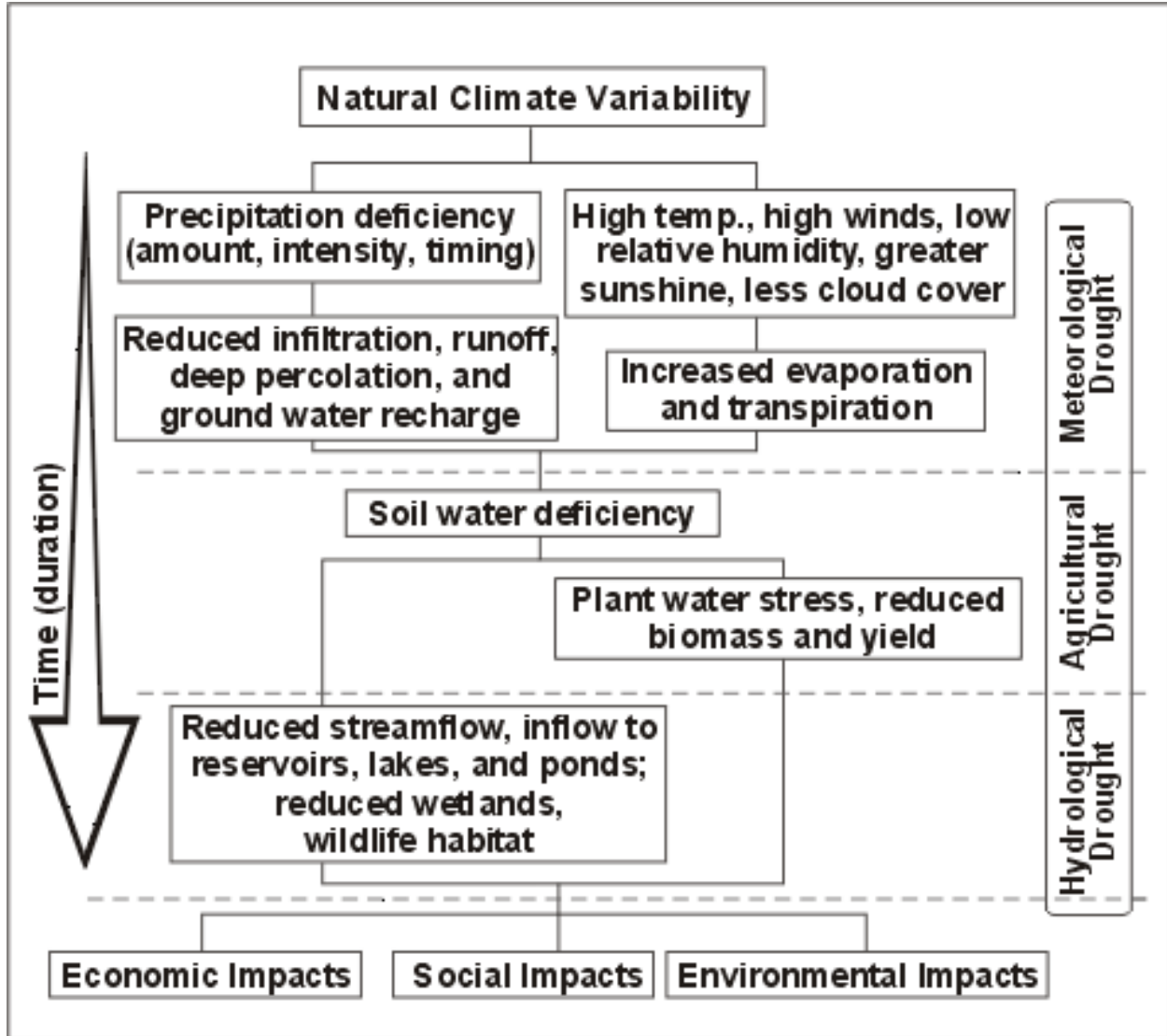
According to the State Hazard Mitigation Plan, the vulnerability of Carbon County to a dam failure in the County is high. Areas vulnerable are downstream of Cooney Dam along Red Lodge and Rock Creeks (Joliet), and downstream of Glacier Lake Dam on Rock Creek (Red Lodge.) If one of these two dams were to fail, structures and populations downstream would be affected.

### **Drought**

Drought is a gradual phenomenon. Although droughts are sometimes characterized as emergencies, they differ from typical emergency events. Most natural disasters, such as floods or forest fires, occur relatively rapidly and afford little time for preparing for disaster response. Droughts occur slowly, over a multi-year period, and it is often not obvious or easy to quantify when a drought begins and ends.

- Drought is a complex issue involving (see Figure 3.4) many factors—it occurs when a normal amount of moisture is not available to satisfy an area’s usual water-consuming activities. Drought can often be defined regionally based on its effects:
- Meteorological drought is usually defined by a period of below average water supply.
- Agricultural drought occurs when there is an inadequate water supply to meet the needs of the state’s crops and other agricultural operations such as livestock.
- Hydrological drought is defined as deficiencies in surface and subsurface water supplies. It is generally measured as streamflow, snowpack, and as lake, reservoir, and groundwater levels.
- Socioeconomic drought occurs when a drought impacts health, well-being, and quality of life, or when a drought starts to have an adverse economic impact on a region.

Figure 3.4. Causes and Impacts of Drought



Source: National Drought Mitigation Center

Drought in the United States is monitored by the National Integrated Drought Information System (NIDIS). A major component of this portal is the U.S. Drought Monitor. The Drought Monitor concept was developed jointly by the NOAA's Climate Prediction Center, the NDMC, and the USDA's Joint Agricultural Weather Facility in the late 1990s as a process that synthesizes multiple indices, outlooks and local impacts, into an assessment that best represents current drought conditions. The final outcome of each Drought Monitor is a consensus of federal, state, and academic scientists who are intimately familiar with the conditions in their respective regions. A snapshot of the drought conditions in Carbon County and the State of Montana can be found in Figure 3.5.

Figure 3.5. Current Carbon County Drought Status

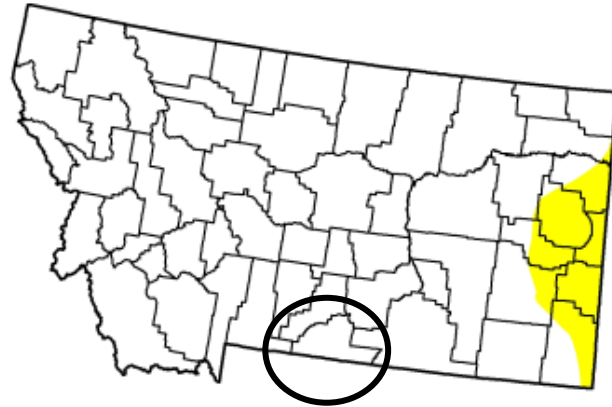
# U.S. Drought Monitor

## Montana

January 3, 2012  
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	93.41	6.59	0.00	0.00	0.00	0.00
Last Week (12/27/2011 map)	93.74	6.26	0.00	0.00	0.00	0.00
3 Months Ago (10/04/2011 map)	51.23	48.77	0.00	0.00	0.00	0.00
Start of Calendar Year (12/27/2011 map)	93.74	6.26	0.00	0.00	0.00	0.00
Start of Water Year (09/27/2011 map)	51.78	48.22	0.00	0.00	0.00	0.00
One Year Ago (12/28/2010 map)	100.00	0.00	0.00	0.00	0.00	0.00



Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

<http://droughtmonitor.unl.edu>

Source: US Drought Monitor



Released Thursday, January 5, 2012  
Brad Rippey, U.S. Department of Agriculture

Annual precipitation varies greatly across Carbon County. Average precipitation for any given year average greater than 80 inches in areas of the County to less than 6 inches in other areas of the County. The eastern and southern portions of the County are some of the driest areas in the state of Montana. It is not uncommon for temperatures to reach the low 100's in these same dry areas during July and August.

### Historic occurrences

The Bridger Times reported a prediction from the State Entomologist on January 16, 1936, that Carbon County will be quite heavily infested with grasshoppers in the 1936 season. Extreme drought in the County in the early 1930's was reported during several of the personal interviews. (Melvin Brown, Belfry). The State of Montana Farm Service Agency tracks drought and USDA Secretarial Disaster Designations for Carbon County. Past Secretarial Drought Designations for the County are shown in Table 3.5.

**Table 3.5. Disaster Declaration (1998-1/2012)**

Designation No.	Date Designated	Type of Disaster	Designation Type
S1269	11/24/98	Drought	Secretarial
S1354	9/22/99	Wildfire, Drought	Secretarial
S1468	1/11/01	Drought	Secretarial
S1538	5/29/01	Drought	Secretarial
S1579	11/1/01	Drought, Wildfire	Secretarial
S1624	3/27/02	Drought	Secretarial
S1645	5/31/02	Drought	Secretarial
S1951	9/7/04	Drought	Secretarial
S1972	10/28/04	Drought	Secretarial
S2406	10/10/06	Drought	Secretarial
S2963	1/5/10	Freeze and cold	Secretarial

Source: Montana Farm Services Administration

The NCDC reports one drought event for the County. In August of 1994, a combination of low winter snowpack and below normal summer rainfall brought widespread drought conditions to the entire state. Drought emergencies were declared in a number of Montana counties with 83% of the State reported under drought conditions at mid-month. The drought adversely affected stream fisheries due to low water levels and high water temperatures, lowered crop yields, and exacerbated wildfires.

As shown in Figure 3.6, between 1895 and 1995, Carbon County has been in severe or extreme drought 15% to 19.9% of the time. Figure 3.6 is based on the Palmer Drought Severity Index (PDSI), which quantifies drought in terms of soil moisture and is used by federal agricultural agencies to determine when to provide drought assistance.



Figure 3.6. Palmer Drought Severity Index

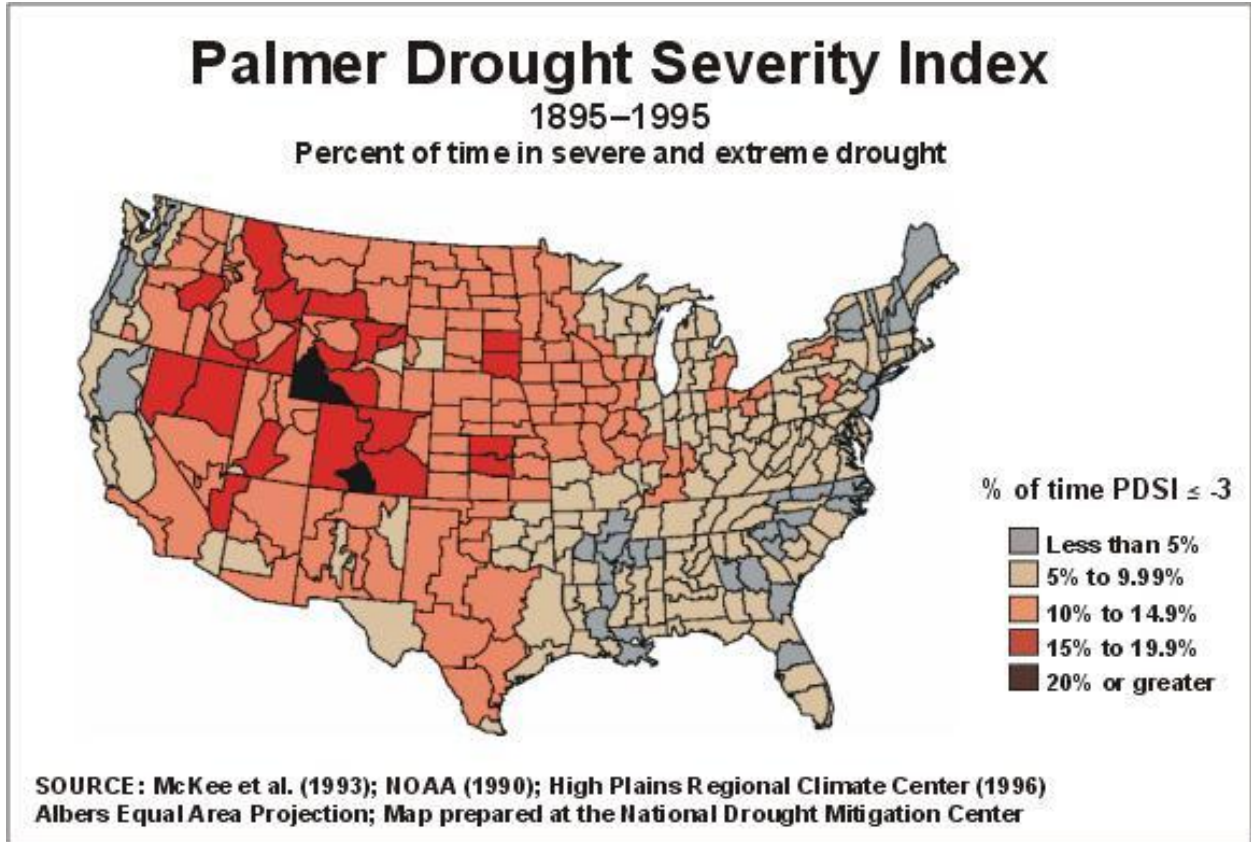
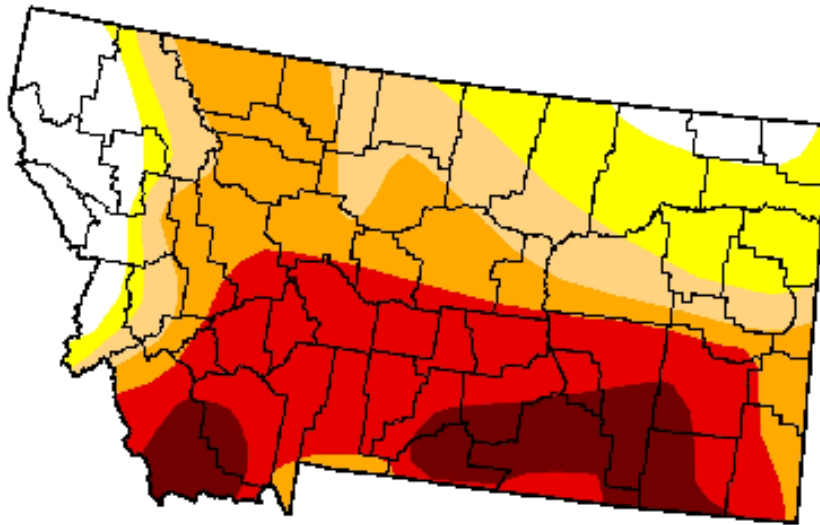


Figure 3.7 below illustrates the extent and severity of the 2004 drought across Montana. Figures 3.8 and 3.9 show how drought conditions during September 2005 and 2010 compared with the September 2004 drought. Based on these images, the 2004 drought saw marked improvement a year later in September 2005. Drought conditions would intensify again in 2006, but not to the same level as that seen in 2004. U.S. Drought Monitor imagery suggests that this drought continued through the first part of 2008. By the fall of 2008, much of the County was still in abnormally dry conditions but no longer in drought.

Figure 3.7. U.S. Drought Monitor for Montana, September 7, 2004

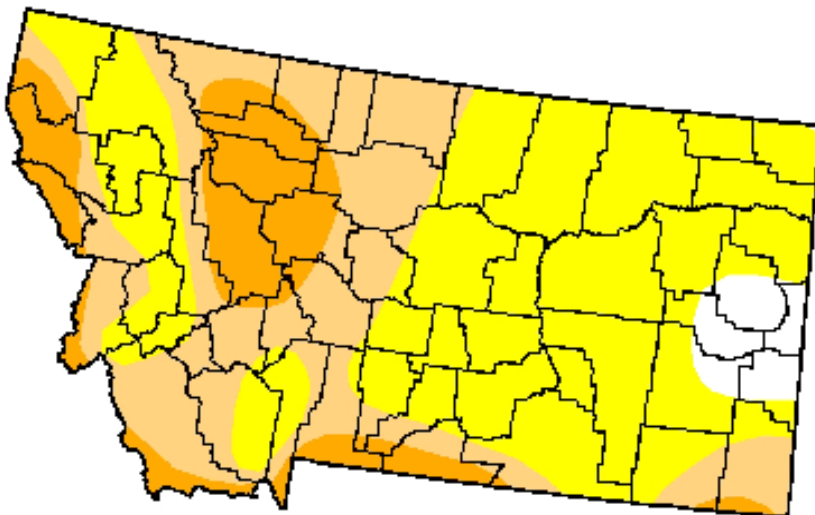


Intensity:

- |                                                                                                         |                                                                                                            |
|---------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
|  D0 Abnormally Dry     |  D3 Drought - Extreme     |
|  D1 Drought - Moderate |  D4 Drought - Exceptional |
|  D2 Drought - Severe   |                                                                                                            |

Source: NDMC

Figure 3.8. U.S. Drought Monitor for Montana, September 6, 2005

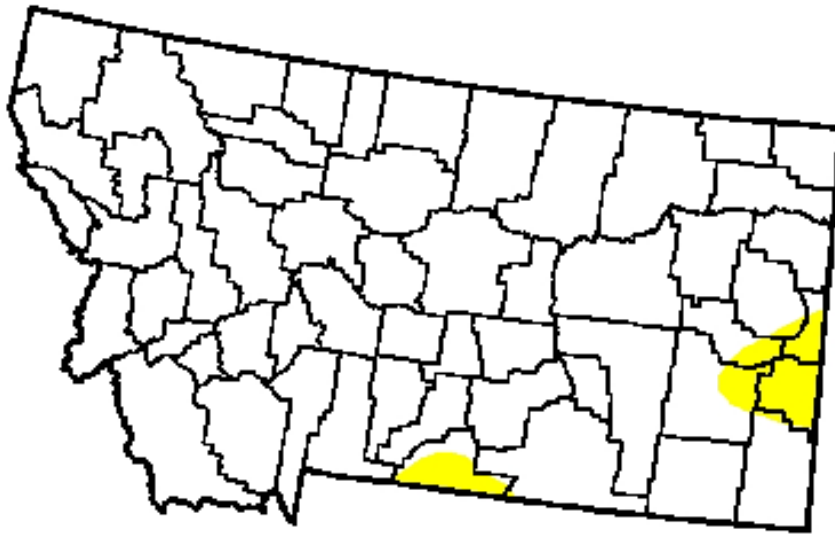


Intensity:

- |                                                                                                           |                                                                                                              |
|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
|  D0 Abnormally Dry     |  D3 Drought - Extreme     |
|  D1 Drought - Moderate |  D4 Drought - Exceptional |
|  D2 Drought - Severe   |                                                                                                              |

Source: NDMC

Figure 3.9. U.S. Drought Monitor for Montana, September 7, 2010



Intensity:

- |                                                                                                         |                                                                                                            |
|---------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
|  D0 Abnormally Dry     |  D3 Drought - Extreme     |
|  D1 Drought - Moderate |  D4 Drought - Exceptional |
|  D2 Drought - Severe   |                                                                                                            |

Source: NDMC

Likelihood of Future Occurrence

Table 3.5 suggests that Carbon County suffers from drought with high regularity. Figure 3.6 shows that the County has been in drought 15-19.99% of the time. Given this, the County has a high likelihood of future occurrence of drought.

Vulnerability

The County is directly vulnerable to drought from two standpoints. The first being lack of precipitation or rainfall in the county itself, the second being when precipitation (primarily snowfall) is below normal in watersheds draining into and through Carbon County. Snowmelt runoff from upstream watersheds is critical to provide adequate water for irrigation and aquifer replenishment in the county. Wide-spread, long-lasting drought has the potential to cause the most damage by affecting agriculture, domestic water supplies, and fire danger. Dryland and irrigated farming and livestock production provide important sources of income for Carbon County. The County has an extensive system of irrigation ditches that deliver water from the higher elevations across the benches to the valley bottoms and within the tilled valley bottoms. Drought and blight can have adverse effects on farm and livestock production, domestic and municipal water supplies, and wildland fire danger. Drought generally does not directly affect structures.

## Earthquakes

The State of Montana 2010 Mitigation Plan defines an earthquake as 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. The released energy is transferred to the surrounding materials as vibratory motion known as seismic waves. As the seismic waves pass from one type of geological material to another, they may be amplified or dampened based on the composition of the new material and the energy will decrease with distance. Once the vibrations reach the ground surface they are transferred to man-made buildings, infrastructure or critical facilities. If the waves are strong enough and the structure is not designed or built to accommodate the shaking, the vibration can cause damage to or failure of the building, infrastructure or critical facility.

Magnitude and intensity are two ways earthquakes are measured. Magnitude measures the energy released at the source of the earthquake and is measured by a seismograph. Intensity is a measure of the shaking produced by an earthquake at a certain location and is based on felt affects. A comparison of magnitude and intensity is shown in Table 3.6.

**Table 3.6. Richter and Modified Mercalli Scales for Measuring Earthquakes**

Magnitude (Richter Scale)	Modified Mercalli Intensity
1.0 – 3.0	I
3.0 – 3.9	II, III
4.0 – 4.9	IV – V
5.0 – 5.9	VI – VII
6.0 – 6.0	VII – IX
7.0 and higher	VIII or higher

Source: USGS Earthquake Hazards Program

Intensity is gauged by how an earthquake affects people, structures and the natural environment. The Modified Mercalli Intensity Scale is the standard scale used in the United States to measure intensity. Table 3.7 provides the abbreviated descriptions for each intensity level.

**Table 3.7. Modified Mercalli Intensity (MMI) Scale**

MMI	Felt Intensity
I	Not felt except by a very few people under special conditions. Detected mostly by instruments.
II	Felt by a few people, especially those on upper floors of buildings. Suspended objects may swing.
III	Felt noticeably indoors. Standing automobiles may rock slightly.
IV	Felt by many people indoors; by a few outdoors. At night, some people are awakened. Dishes, windows, and doors rattle.
V	Felt by nearly everyone. Many people are awakened. Some dishes and windows are broken. Unstable objects are overturned.

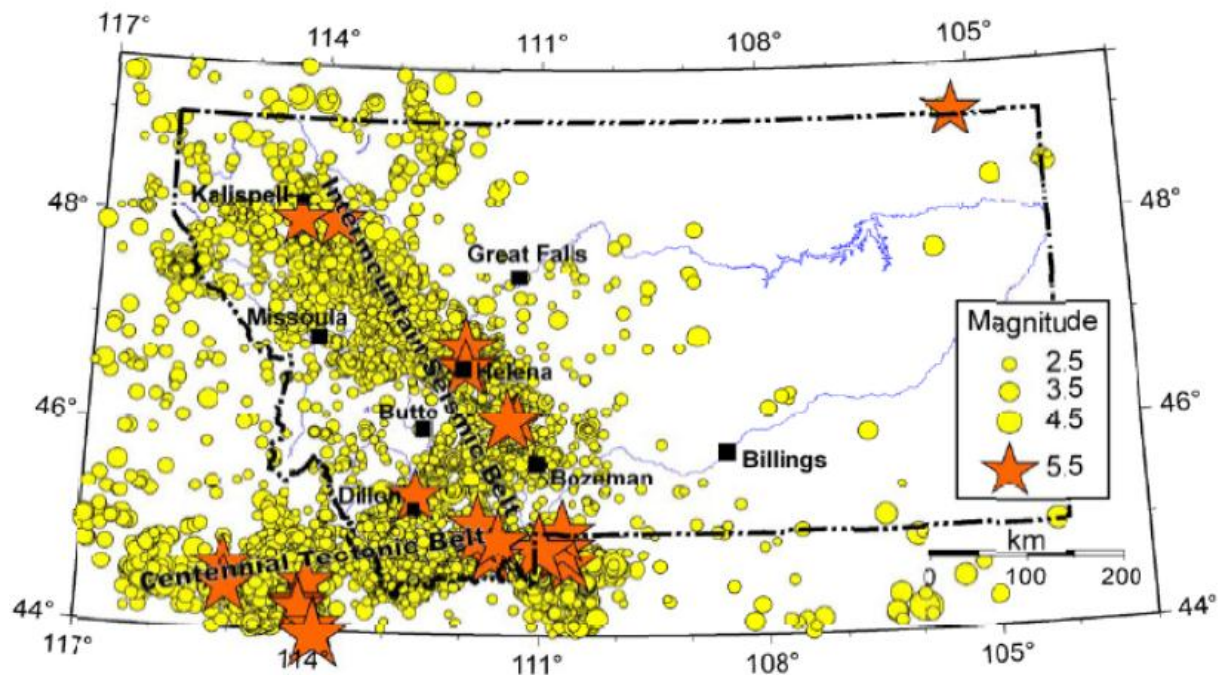
MMI	Felt Intensity
VI	Felt by everyone. Many people become frightened and run outdoors. Some heavy furniture is moved. Some plaster falls.
VII	Most people are alarmed and run outside. Damage is negligible in buildings of good construction, considerable in buildings of poor construction.
VIII	Damage is slight in specially designed structures, considerable in ordinary buildings, and great in poorly built structures. Heavy furniture is overturned.
IX	Damage is considerable in specially designed buildings. Buildings shift from their foundations and partly collapse. Underground pipes are broken.
X	Some well-built wooden structures are destroyed. Most masonry structures are destroyed. The ground is badly cracked. Considerable landslides occur on steep slopes.
XI	Few, if any, masonry structures remain standing. Rails are bent. Broad fissures appear in the ground.
XII	Virtually total destruction. Waves are seen on the ground surface. Objects are thrown in the air.

Source: USGS Earthquake Hazards Program

### Historic occurrences

According to the U.S. Geological Survey, Montana is one of the most seismically active states in the country. However, Montana's earthquake activity occurs primarily in the western third of the state. This is shown in Figure 3.10

**Figure 3.10. Historic Earthquakes in Montana 1925-2010**



Source: 2010 Update to the State of Montana Multi-Hazard Mitigation Plan

The first significant quake on record that would have been felt in Carbon County was on June 27, 1925. Although centered in southwestern Montana, the quake shook locations all over the state and beyond the state boundaries in all directions. The largest quake in Montana's history was the Hebgen Lake earthquake on August 17, 1959. The quake

was a magnitude of 7.1. Shocks from the quake were felt in Carbon County and many long-time residents of the County recall the disaster. The largest earthquake swarm since 1973 occurred in the fall of 1985. More than 3,000 earthquakes struck the upper Madison Valley area. None were felt in Carbon County (Tracking Changes in Yellowstone's Restless Volcanic System, U.S.G.S. Website). Interviews of over 25 county residents provided only one recollection of a minor quake that had occurred in the back country, caused no damage, and was never documented. The U.S. Geological Survey Seismicity of Montana from 1990-2006 has no record of any earthquakes in Carbon County. A search of the USGS National Earthquake Information Center database shows 17 events between 1978 and 2010, ranging from 2.5 to 4.2 on the Richter scale. The epicenters were all greater than 50 miles away, so none of these events were felt inside the County.

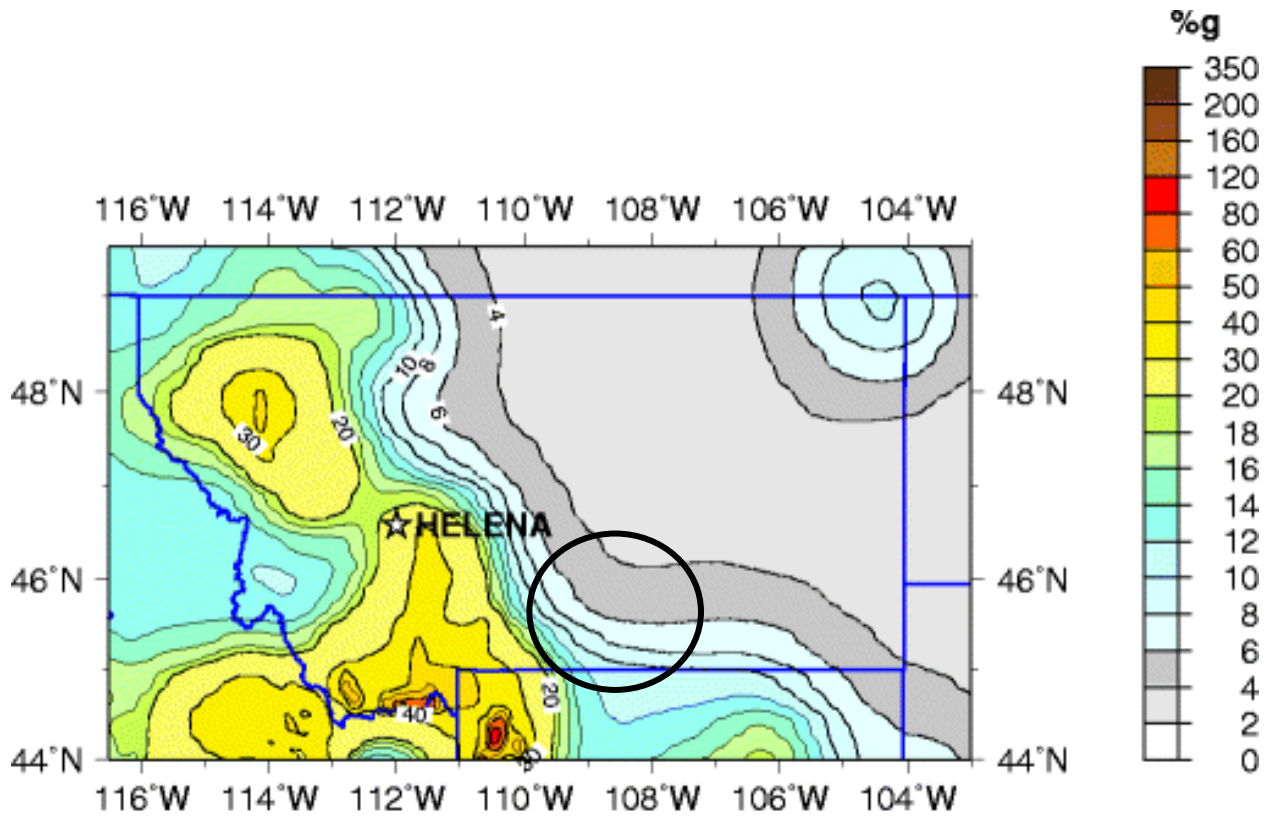
### Likelihood of Future Occurrences

The U.S. Geological Survey (USGS) issues National Seismic Hazard Maps as reports every few years. These maps provide various acceleration and probabilities for time periods. Figure 3.11 depicts the peak horizontal acceleration (%g) with 2% probability of exceedance in 50 years for the County, also known as the 2,500-year probabilistic map. Until recently, the 500-year map was often used for planning purposes for average structures, and was the basis of the most current Uniform Building Code. The new International Building Code, however, uses a 2,500-year map as the basis for building design.

The figure demonstrates that the County falls in the 6%g to 14%g area. This data indicates that the expected severity of earthquakes in the County is fairly limited, as damage from earthquakes typically occurs at peak accelerations of 30%g or greater. However, the potential, though remote, does exist for damaging earthquakes.



Figure 3.11. Peak Horizontal Acceleration from Earthquake in Carbon County

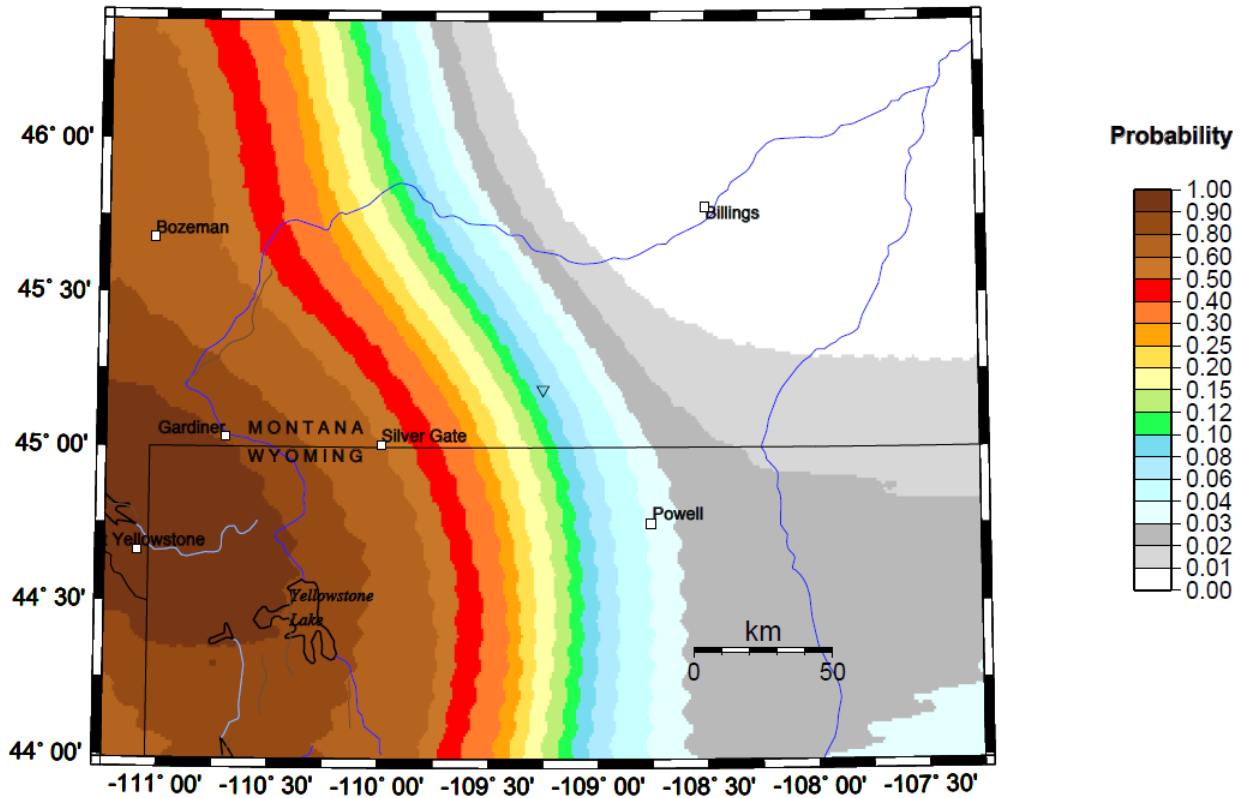


**Peak Acceleration (%g) with 2% Probability of Exceedance in 50 Years  
site: NEHRP B-C boundary  
National Seismic Hazard Mapping Project (2008)**

Source: USGS

In addition, Figure 3.12 from the USGS shows the probability that an earthquake of magnitude 5 or greater will occur in the next 50 years within 50 kilometers of Red Lodge (marked by the triangle in the center of the image). The chance of such an event occurring is 8 to 10%.

Figure 3.12. Probability of Earthquake with M>5.0 within 50 years



Source: USGS 2009 Earthquake Probability Mapping

### Vulnerability

Earthquakes will continue to occur in Montana; however the precise time, location, and magnitude of future events cannot be predicted. As discussed above, earthquake hazard areas in Montana are concentrated in the western portion of the state, which is part of the Intermountain Seismic Belt (Figure 3.10 above). Numerous factors contribute to determining areas of vulnerability: historical earthquake occurrence, proximity to faults, soil characteristics, building construction, and population density, to mention a few.

According to Earthquake Studies Specialist, Mike Stickney at the Montana Bureau of Mines and Geology (MBMG), Carbon County is located east of the most seismically active areas in Montana. The chances of having a major earthquake centered in Carbon County are very small. Carbon County is most likely to feel shaking as a result of an earthquake centered elsewhere if any shaking is felt at all. Damage from an earthquake although unlikely, could conceivably occur in Carbon County if a large magnitude earthquake occurred elsewhere. If the ground was saturated at the time of the earthquake the potential for landslides would be increased. Infrastructure and structures across the entire County would be at risk if an earthquake did occur, particularly unreinforced masonry structures such as the historic buildings in downtown Red Lodge. Impacts to structures could include structural damage, cracked foundations,



and/or even collapse. Given the lack of potentially active faults and historic occurrences in Carbon County, earthquakes are a low probability but potentially high consequence hazard to the planning area. A probabilistic HAZUS earthquake scenario was performed as part of this plan's development to show the results of a more worst-case scenario. The results of this study are discussed in the Potential Loss Estimates section of this plan.

## **Earth Movement**

The term earth movement includes landslides, slumping, and subsidence. Earth movement may occur suddenly as catastrophic landslides or rockfalls, but more commonly, occurs as the slow creep of soil down gentle slopes. Precipitation, topography, geology, and human activities can all trigger landslides. In landslide-prone areas, anything affecting slope condition, such as construction, seismic activity, or increased soil moisture, may cause movement or may reactivate prior movement. Recent landslide movements often are the reactivation of smaller sections of older, unstable landslide masses. The USDA has mapped the soils in Carbon County. Soil suitability is considered by the County Planning Board during subdivision review on proposed developments. Earth movement has the potential for causing loss of life and/or property damage.

### **Landslide/Slumping**

The term landslide includes all types of gravity-caused mass movements of earth material, ranging from rock falls, slumps, rock slides, mud slides, and debris flows. Landslides are among the most common geologic hazards in Montana, causing damage in rural and urban areas of the State. Sudden movements are often spectacular and receive much publicity. However, slower movement can also cause severe problems in areas as well. The effects of the very slow movements can be seen along many roadways in the form of leaning trees, misaligned fences and walls, and damaged road surfaces and foundations. Whether caused solely by natural processes or aggravated by human activity, when landslides occur in proximity to human-made structures, repairs and remediation can be costly.

The surface of the earth is constantly undergoing erosion and change. Earth movement may occur suddenly as catastrophic landslides or rockfalls, but more commonly, occurs as the slow creep of soil down gentle slopes. Precipitation, topography, geology, and human activities can all trigger landslides. In landslide-prone areas, anything affecting slope condition, such as construction, seismic activity, or increased soil moisture, may cause movement or may reactivate prior movement. Recent landslide movements often are the reactivation of smaller sections of older, unstable landslide masses.

Slumps are landslides in which the moving material moves in a block. Small slumps are common in roadcuts, but they can also be huge. The most common cause of slumps is excess groundwater, whether from heavy rains or from human activities that affect the drainage.

## **Debris Flow**

Debris flows are among the most destructive geologic processes that occur in mountainous areas. A debris flow is a mass of water and earth materials that flows down a stream, ravine, canyon, arroyo, or gulch. Technically if more than half of the solids in the mass are larger than sand grains (e.g., rocks, stones, boulders) the event is called a debris flow, otherwise it is called a mudslide or mudflow. For the purposes of this plan the term debris flow is meant to be a global term to include mudslides/ mudflows. Debris flows can occur rapidly with little warning during torrential rains. Debris and mudflows generally occur with floods and downpours associated with the late summer monsoon season. The debris flow problem can be exacerbated by wildfires that remove vegetation that serves to stabilize soil from erosion.

## **Subsidence**

Land subsidence is the sinking of the land over manmade or natural underground voids. Subsidence occurs naturally and also through man-driven or technologically exacerbated circumstances. Natural causes of subsidence occur when water in the ground dissolves minerals and other materials in the earth, creating pockets or voids. When the void can no longer support the weight of the earth above it, it collapses, causing a sinkhole depression in the landscape. Often, natural subsidence is associated with limestone erosion, but may also occur with other water-soluble minerals. Man-driven or technology-exacerbated subsidence conditions are associated with the lowering of water tables, extraction of natural gas, or subsurface mining activities. As the underground voids caused by these activities settle or collapse, subsidence occurs on the surface.

### Historic Occurrences

#### **Landslide and Debris Flows**

Land and rockslides on a very small scale have and continue to occur frequently on the Beartooth Highway. These landslides consisting primarily of rock are generally confined to small stretches of the highway and quickly removed to facilitate traffic flow. Daily freeze-thaw cycles during the spring and fall often trigger these rockslides. The SHEL DUS data base has one recorded entries for Carbon County for a landslide in 2005.

The Carbon County News reported that in March of 2005, rain and snow combined to shut down 12 miles of the Beartooth Highway effectively closing the route between Cooke City and Red Lodge and Yellowstone Park. On Thursday, May 19, 2005, weeks of heavy wet snow and rain combined to create the conditions that lead to another massive mud and rock slides along the Beartooth Highway (see Figure 3.13). The road is a crucial link to the western route to Yellowstone Park and is only open to traffic from late-May until mid-October. According to the May 26, 2005, Carbon County News story, "In the worst areas, an avalanche of mud, rocks and debris completely swept away stretches of highway, leaving guardrails and culvert pipes shredded and dangling in

mid-air. On less affected sections, dirt, rocks, trees and debris blanketed the road to a depth of several feet.” Department of Transportation employees were at work clearing the remaining snow for the upcoming seasonal highway opening when the slides occurred. No one was injured. On May 27, Governor, Brian Schweitzer declared Carbon County a disaster as a result of the slides. An Executive Order was issued declaring an emergency in Carbon County. The order requested assistance from the Federal Highway Administration for the repairs. The \$15.2 million repair involved excavating rock and slide debris, reconstructing the drainage, roadway and new alignment, and constructing tie-back walls. Rock fall fences were also constructed at several locations and overall drainage capacity was increased by creating water diversions along stable locations on the mountain and constructing special inlets to allow rock over 3-inch diameter to pass. The highway was reopened on May 27<sup>th</sup> of 2006.

**Figure 3.13. Beartooth Highway Debris Flow May 19, 2005**

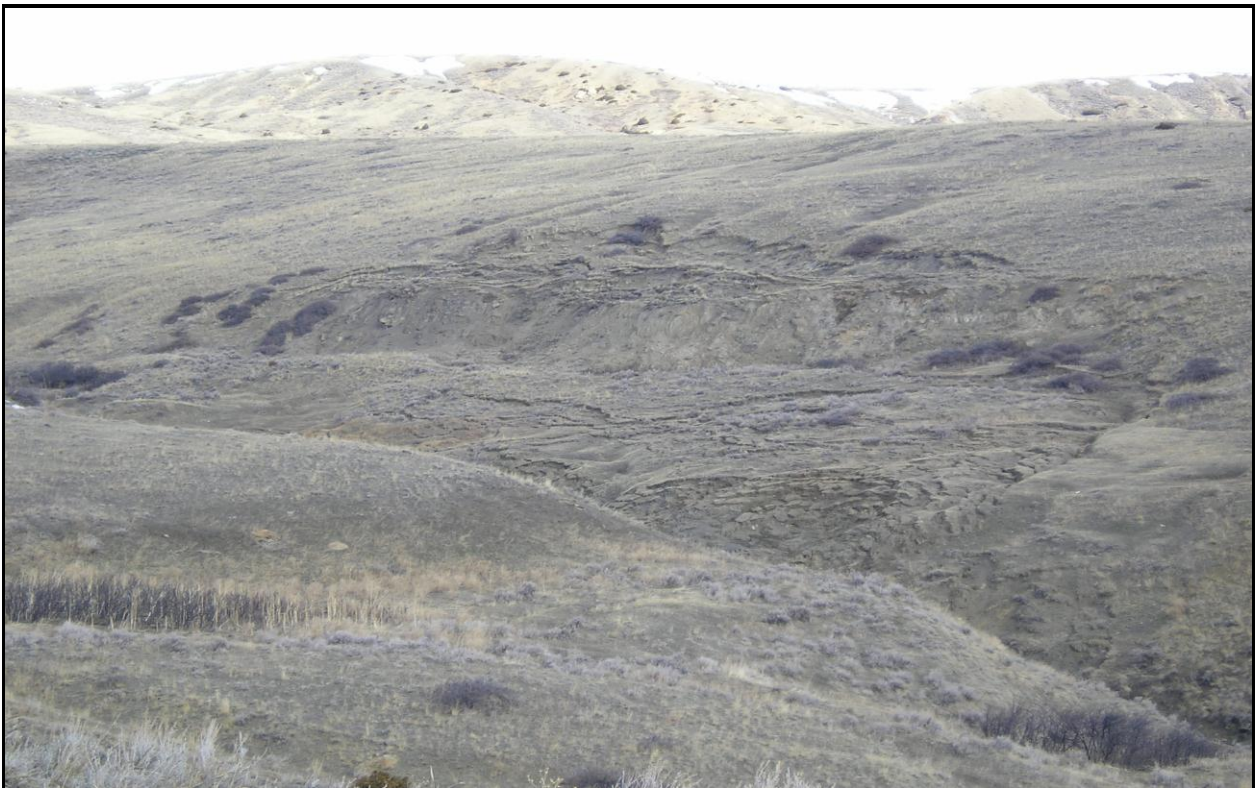


Source: 2010 Update to the State of Montana Multi-Hazard Mitigation Plan

On July 27, 2009, heavy rain over the Cascade Fire Area of 2008 caused two debris flows occurred on the south side of the West Fork of Rock Creek covering West Fork Road. In addition, two debris flows occurred on the north side of the West Fork of Rock Creek. Data shows that 1.85 inches of rain fell within three hours over the burn area with additional rainfall occurring beyond three hours. As a result of the debris flows and landslides, large boulders and downed trees covered West Fork Road. No injuries or fatalities were attributed to this event. Property damage and crop damage estimates were unavailable.

## Slumping

A drive around the benches and foothills of Carbon County shows ample visual evidence of past localized slumping. Slumping occurs when soils prone to movement are located on slopes which then become saturated. The saturation can occur as a result of snowmelt with or without rain, heavy rain events, and/or seepage from irrigation facilities. Soils with high clay content hold the most moisture and thus become the heaviest and most prone to sliding. The Bear Creek Hill located between Bear Creek and Red Lodge is composed of clay underlain by shale. Three major slumps have occurred on the Bear Creek Hill in the past 15 years, each time necessitating extensive reconstruction and repair of Highway 308 by the Montana Department of Transportation. Localized slumps occur along the vast network of irrigation ditches and canals in the County.



Slumping east of the Bearcreek Hill from saturated soils during the spring of 2011.

## Subsidence

A number of underground coal mines were once in production in Carbon County. The mines were located at Red Lodge, Bear Creek, and Bridger. The underground workings have largely filled with water since the cessation of mining operations. No subsidence related to these mines has been reported.



## Likelihood of Future Occurrences

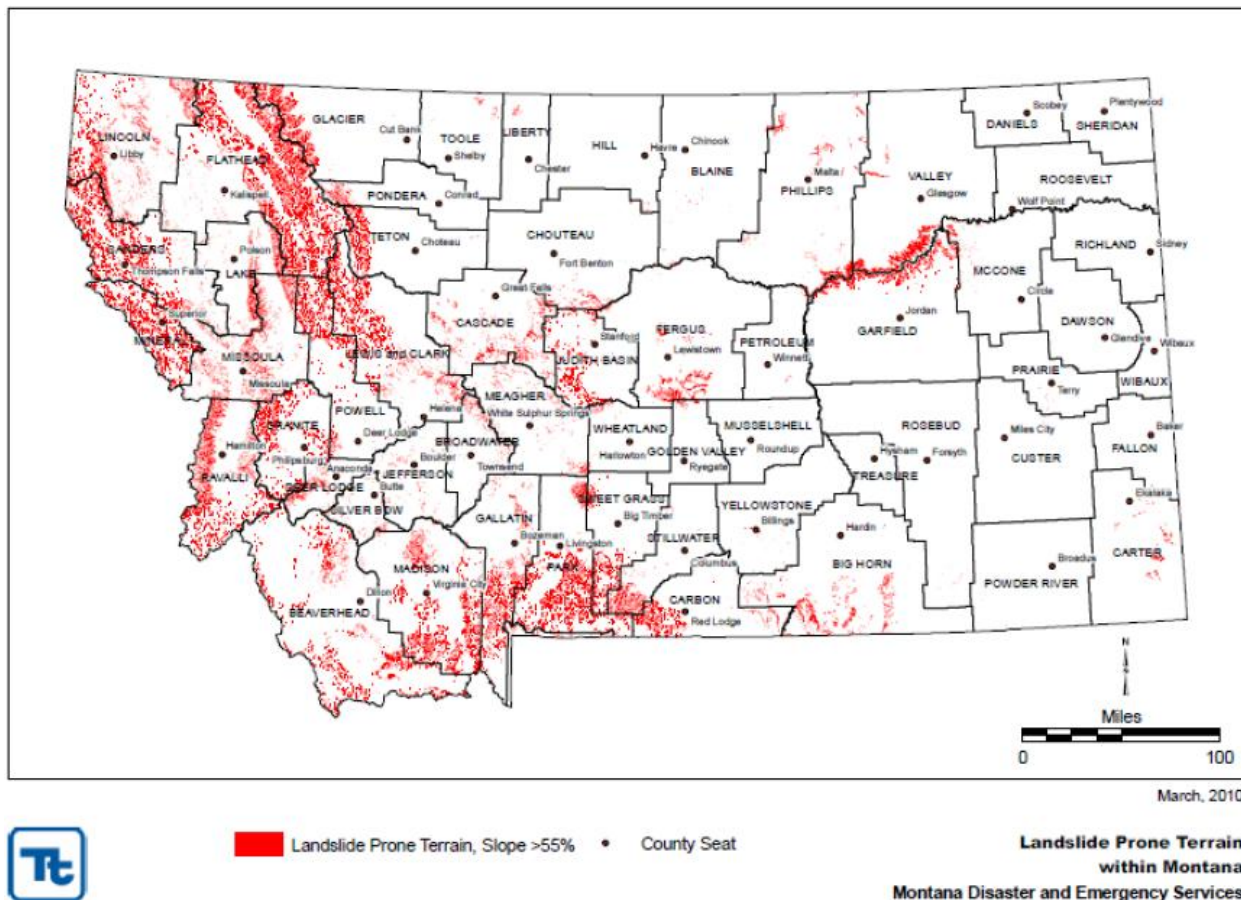
When considering all of the earth movement sub-hazards (landslide, slumping, subsidence), it is likely that earth movement will occur in the County. Subsidence rates can vary greatly over time and geographic location, and there is no clear consensus on whether the County will be impacted in the future. Given the topography of the County, it is likely that slumping and landslides will continue to occur in the County.

## Vulnerability

### **Landslides/Debris Flows**

Landslides and rockslides will continue to occur. The primary asset at risk from rockfall, debris flow and landslide is the Beartooth Highway, a seasonal federal highway maintained by the State of Montana. As shown in Figure 3.14, areas of western Carbon County are at risk to landslide.

**Figure 3.14. Landslide areas in Carbon County and the State of Montana**



Source: 2010 Update to the State of Montana Multi-Hazard Mitigation Plan

## **Slumping**

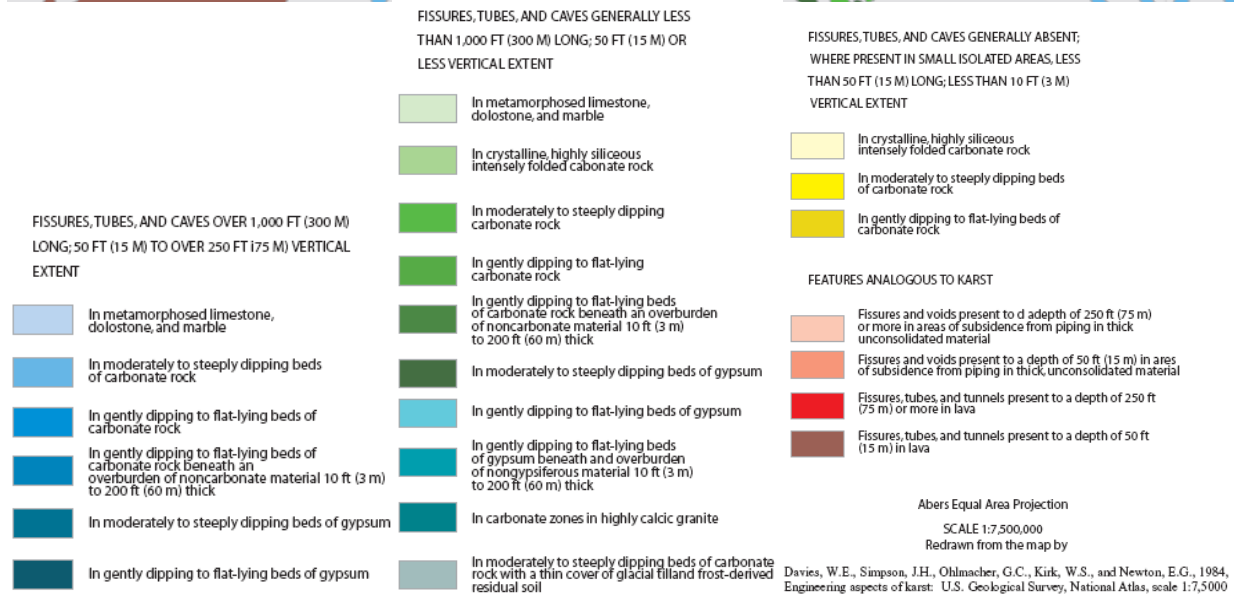
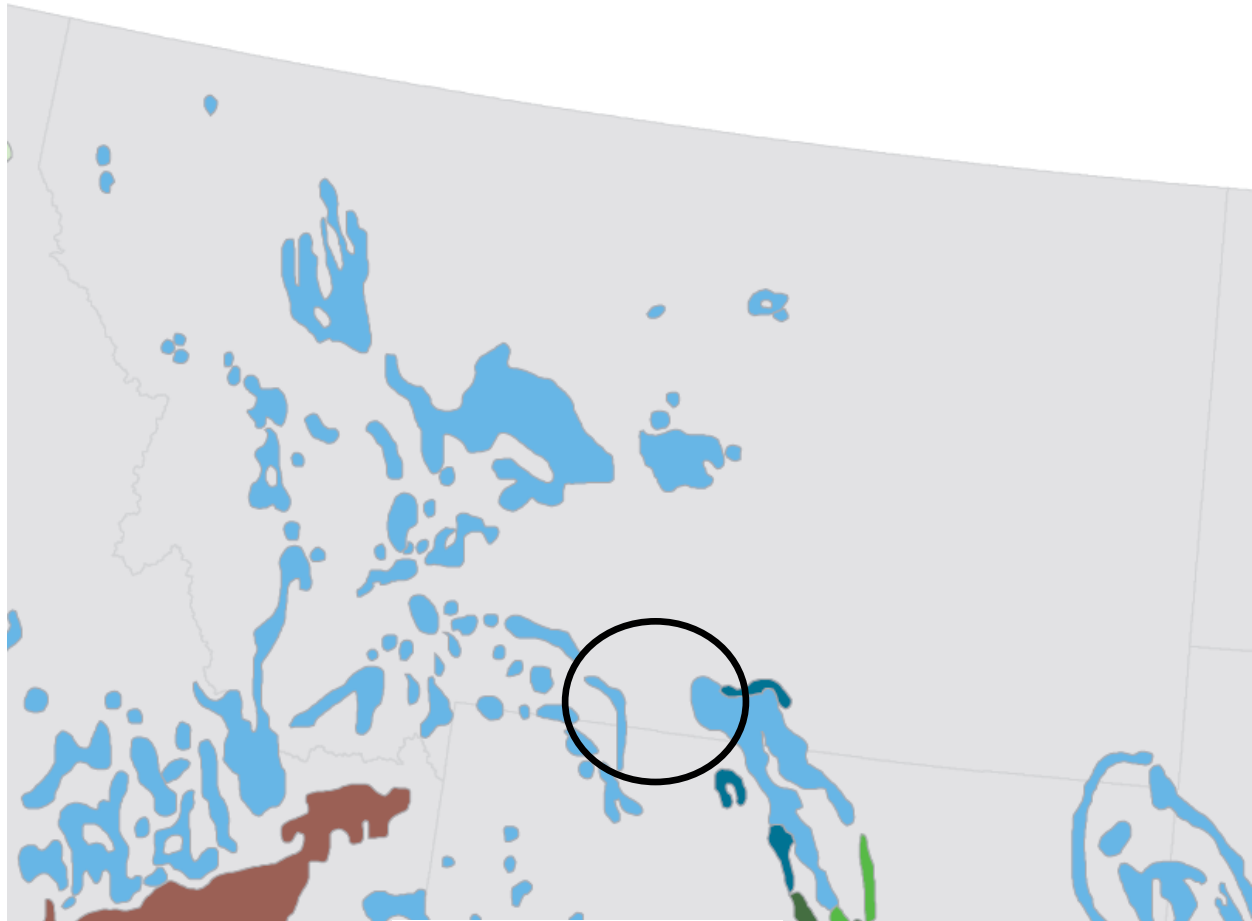
It is challenging to predict the number and frequency of earth slumping events in the County because their occurrence is so dependent on the timing and intensity of precipitation and snowmelt. (G.Hill, Natural Resources Conservation Service) However, because Carbon County has slopes and soils that will slide, slumping will occur in the future. Based upon past slides, vulnerable areas include the edges of east and west benches above Rock Creek and the Bearcreek Hill. Due to the locations of structures in relation to potentially slumping areas, it is most likely that infrastructure (highways) would be damaged rather than structures. Ground saturation during the spring of 2011 caused hillside slips with some deposition of material on county roads. The county is in the process of being reimbursed just under \$.5 million from FEMA for repairs needed to county infrastructure. The majority of the damage was to roads from slumping and sloughing.

## **Subsidence**

Major subsidence of the ground over historic mine workings appears unlikely because the situation seems to have stabilized over time—in part because underground workings are now filled with water. However, subsidence remains a possibility in locations under the heart of the city of Red Lodge, the area west of Bridger, and in the Bear Creek area.

In addition, there are areas of Carbon County that are at risk to subsidence. The Madison Limestone (Mississippian) lies under karst areas in western Montana and adjacent parts of Idaho and Wyoming. Passages in a single cave are commonly up to 2 mi (3.2 km) long. Open fissures up to 1,000 ft (300 m) long and shallow, open joint systems are also common. Fissures and cavern passages extend as much as 1,000 ft (300 m) deep. Large quantities of water are present in the lower parts of the fissures and in some of the deeper cavern passages. Karst features developed at the end of the Mississippian Period are common in the Madison Limestone. Most of the features are solution tubes, caves, and small fissures that have been filled with younger deposits that are now solidified into rock. Because of differences in materials, residual openings, and secondary solution, these features can give rise to foundation problems and leakage. These areas of possible subsidence are shown in Figure 3.15. No subsidence related to karst has been reported.

**Figure 3.15. Subsidence Areas in Carbon County and the State of Montana**



Source: National Karst Map

## **Flood**

Three types of floods are possible hazards in Carbon County, seasonal runoff river floods, ice-jam river floods, and flash-floods. Floods of all types can cause extensive damage to property, crops, and infrastructure; result in evacuations, loss of income, and injury and loss of life. Floods are natural events for rivers and streams and floodplains have historically proven attractive to development. Stretches of the 100-year floodplain have been mapped for both Rock Creek and the Clarks Fork of the Yellowstone.

### **Floodplain Mapping**

FEMA established standards for floodplain mapping studies as part of the National Flood Insurance Program (NFIP). The NFIP makes flood insurance available to property owners in participating communities adopting FEMA-approved local floodplain studies, maps, and regulations. Floodplain studies that may be approved by FEMA include federally funded studies; studies developed by state, city, and regional public agencies; and technical studies generated by private interests as part of property annexation and land development efforts. Such studies may include entire stream reaches or limited stream sections depending on the nature and scope of a study. A general overview of floodplain mapping is provided in the following paragraphs.

### **Flood Insurance Study (FIS)**

The FIS develops flood-risk data for various areas of a community that is used to establish flood insurance rates and to assist the community in its efforts to promote sound floodplain management. The current Carbon County FIS is dated August 15, 1990.

### **Flood Insurance Rate Map (FIRM)**

The FIRM is designed for flood insurance and floodplain management applications. For flood insurance, the FIRM designates flood insurance rate zones to assign premium rates for flood insurance policies. The designated flood zones are based on flood risk in the area. For floodplain management, the FIRM delineates 100- and 500-year floodplains, floodways, and the locations of selected cross sections used in the hydraulic analysis and local floodplain regulations. Land areas that are high risk, within the 100-year floodplain (or with a one percent annual chance of flooding), are called Special Flood Hazard Areas (mapped as A zones.). In communities that participate in the National Flood Insurance Program (NFIP), mandatory flood insurance purchase requirements apply to all Zones A (i.e., those areas subject to a 100-year flood event). The County FIRMs are being replaced by new digital flood insurance rate maps as part of FEMA's Map Modernization program, which is discussed further below.



## Letter of Map Revision (LOMR) and Map Amendment (LOMA)

LOMRs and LOMAs represent separate floodplain studies dealing with individual properties or limited stream segments that update the FIS and FIRM data between periodic FEMA publications of the FIS and FIRMs.

## Digital Flood Insurance Rate Maps (DFIRM)

As part of their Map Modernization program, FEMA is converting paper FIRMS to digital FIRMs (DFIRMS). These digital maps:

- Incorporate the latest updates (LOMRs and LOMAs), Utilize community supplied data,
- Verify the currency of the floodplains and refit them to community supplied base maps,
- Upgrade the FIRMs to a GIS database format to set the stage for future updates and to enable support for GIS analyses and other digital applications,
- and Solicit community participation.

Preliminary Carbon County DFIRMs, dated July 29, 2011, were used for the flood analysis in this plan.

## Flood Insurance

The number of NFIP premiums and amount of coverage in the County increased substantially since 2005. Current NFIP statistics for Carbon County are shown in Table 3.8.

**Table 3.8. Flood Insurance Policy Statistics as of 10/31/2011**

Name	Policies in Force 2005	Insurance In-force 2005	Policies in Force 2011	Insurance In-force 2011
Carbon County	49	\$6,275,200	91	\$20,630,800
Fromberg	4	\$345,800	4	\$713,800
Joliet	4	\$755,000	7	\$1,692,000
Red Lodge	13	\$1,792,800	17	\$3,531,300
<b>Total</b>	<b>70</b>		<b>119</b>	<b>\$26,567,900.00</b>

Source: FEMA, Flood Insurance Statistics Web Page

## Historic Occurrences

County Commissioners, Steering Committee members, and long-time residents were all asked to recall flood events for the PDM project. Recollections were then checked against previous newspaper accounts in the Carbon County News, the Clarks Fork Pioneer, the Bridger Times, and the Carbon County Journal. In addition the SHELDUS and NCDC databases were checked. None of the sources were 100% complete or accurate when considered individually, nor were they all in agreement with each other.

What follows is the general picture painted by all of these sources with examples of some specific flood incidents.

The first flooding related disaster appearing in the County Commission notes was in April 1917. The notes reference a bridge lost at Bridger to an ice jam. June 1918 appears to have produced the costliest flood in the history of the County. The Carbon County Journal reported on June 19, 1918 "Carbon County has been for the past week in a state of semi-isolation in so far as traffic with the outside world is concerned because of the swollen streams that have poured their waters over the lowlands." The paper went on to report that rail service failed, there had been no mail for four days, the wagon bridge over the Yellowstone at Laurel was out and the railroad bridge offered the only means to cross the river, and the floods "have caused hundreds and thousands of dollars in damages to farms and bridge and by the paralyzation of train facilities." The area just east of the community of Silesia called the Mason bottom was reportedly under three feet of water and the crops were ruined; a Burlington engine was lost in the river, and land was eaten away. Total losses from the flood in 1918 dollars were estimated at \$200,000. During the same storm, a huge channel was cut through Fromberg, several major irrigation canals were damaged, and the Montana Power Company's line broke resulting in a loss of power and subsequently loss of water because the pumps were inoperable. The Bridger Times of June 14, 1918 reported that "incalculable damage" was done from this same event where "rapidly melting snows sent record-breaking torrents, overflowing lowland, destroying irrigation ditches, and impeding transportation." "Old timers say the water this year is the highest it has been in their recollection."

A serious flash flood also occurred in 1918, in Red Lodge and Bear Creek on July 15, 1918 according to the July 17 Carbon County Journal. The deluge washed out water mains from which Bear Creek gets its drinking water, the railroad tracks were damaged, basements were flooded, garden plots were washed out, and water cut channels in the town streets. The Journal reported that "Old-time residents of this vicinity are unanimous in their verdict that it is the heaviest rain they have ever witnessed."

The next major flood occurred in 1932 along the Clarks Fork River. The Bridger Times of June 9 reported "Heavy rains of the past few days have done some damage to the roads and highways and small bridges and culverts have been washed out." After listing all of these results, however, the article goes on to say that the damage was slight. The County Commissioners' minutes on June 11, 1932, state that they passed a resolution creating an "extreme emergency" in the road and bridge budget. This occurred again in June of 1934, when rains and floods damaged roads and bridges creating an "extreme emergency."

The Bridger Times (8/13/36) reported on a flash flood. A cloudburst in the Sand Creek area, four miles west of Bridger took out a bridge, flowed over the highway, and in some places, streets were damaged. Another extreme public emergency was declared by the County Commissioners in July of 1937 due to road damage and culvert washouts.

Clarks Fork Valley resident Jim Yedlicka recalled an ice-jam flood on the Clarks Fork at Fromberg in the 1940's. Jim and his family "turned out the cattle, left the house and went to the neighbor's. The chickens were lost and so were some goods in the cellar when the jam broke overnight." Jim reported that this was the only time in his lifetime of over 50 years living along the Clarks Fork River that he had to leave his home for a natural disaster. Melvin Brown of Belfry remembered a bad flood on the Clarks Fork River shortly thereafter as a result of an ice jam in 1946. The flood caused the family to move their livestock to safety.

On February 19, 1948, "Sudden Warming of Weather Causes Excessive Runoff" was the headline in the Bridger Times. The paper went on to report that ice jams had formed on the Clarks Fork around the bridge leading to East Bridger forcing surface water over the lowlands. Several thousand dollars of stock were lost and there was much property damage. Many farms were covered by water and the bridge was almost lost. "Warm sun, snowmelt, and water in the ditch west of Main Street was frozen, so runoff began to pour in Bridger Streets." Fortunately this was a short-lived incident with the water receding the following day.

In 1967, a flash flood between Luther and Red Lodge blew out a large culvert as a result of five inches of rain in one storm. A D-4 cat and homestead barn were lost in the flood. (Carl Hansen, Joliet) The Carbon County News reported that eleven consecutive days of rain caused the flash flood that did considerable damage to farms below the highway. Traffic was detoured through Luther. Chickens, a calf, a shed, and farm implements were carried away.

Reuben Steinmetz of the Joliet area reported a spring flood in Joliet in 1967 due to a combination of heavy snow and warm rain that washed out ditch head gates. The same combination of events produced flooding in the City of Red Lodge according to Public Works Director, Orval Boyer.

A flood west of Red Lodge brought down power and phone lines, roads and bridges were washed out and a number of ranch families were stranded according to the Carbon County News on May 15, 1975. "It's going to be real expensive to put the County back in shape. We'll do it ourselves. And we'll get it done" was the reaction of then County Commissioner, Frank Cole.

In 1981, the Carbon County News (6/11/81) reported torrential rains in May. The Bear Creek hill slid and the Clark Fork roared out of its banks threatened bridges, flooded roads, damaged irrigation intakes, and imperiled two homes. Norm Dewell, the first Disaster and Emergency Coordinator for Carbon County recalled a springtime flood on the Clarks Fork in the late 1980's.

The County Commissioners' minutes for February 1996, make mention of probable emergency road closures due to ice jams in the Rockvale area. The ice jams in the Rockvale-Silesia area are mentioned again in the notes on March 6.

In May of 2005, heavy rains and snowmelt on top of saturated ground caused widespread flooding in the western and west-central portions of the County. No injury or loss of life was reported, but basements were flooded in Roberts and Joliet, roads and culverts were affected, and some areas were scoured.

On June 6 of 2007, a large spring storm moved across the Northern Rockies on the afternoon of June 6th through the morning of June 7th. Thunderstorms developed by early afternoon across northern Wyoming and southern Montana, with heavy rainfall beginning in Sheridan, Wyoming and Carbon County, Montana at 330pm and across much of southern Montana by 6pm. By 9pm Wednesday evening, heavy rainfall became more widespread across southern Montana and continued through the overnight hours. By mid-morning on the 6th, rainfall had ended across the impacted area. Runoff from areas upstream of Rosebud County and the Tongue River Reservoir resulted in flooding downstream of the dam. Several stretches of area roads were under water, including 212 and 78. Homes were flooded in Roberts. Water was over the road on Highway 72 south of Belfry, with the highway closed in Wyoming. Flooding was reported on country roads in the area. Property damage and crop damage estimates were not available. No fatalities or injuries were attributed to this flood.

On July 27, 2009, heavy rain over the Cascade Fire Area of 2008 caused the West Fork of Rock Creek to rise out of its banks. Two debris flows occurred on the south side of the West Fork of Rock Creek covering West Fork Road. In addition, two debris flows occurred on the north side of the West Fork of Rock Creek. The water level on the West Fork of Rock Creek was greater than 4 feet above normal and flowing outside of its banks at the peak of the event. Data shows that 1.85 inches of rain fell within three hours over the burn area with additional rainfall occurring beyond three hours. As a result of the debris flows and landslides, large boulders and downed trees covered West Fork Road. No injuries or fatalities were attributed to this flood. Property damage and crop damage estimates were unavailable.

On May 20, 2011, significant flooding occurred on creeks and streams across Carbon County with numerous county roads flooded, closing roads and resulting in significant damage. Emergency Travel only was advised at one point due to the severity of the flooding. Specifically, Rock Creek flooded, resulting in adjacent lowland flooding and closure of Grape Vine Road near Fromberg. Creeks were running out of their banks from the Beartooth Foothills between McLeod and Red Lodge, as well as tributaries of the Clarks Fork of the Yellowstone River from Belfry to Bridger. Five Mile Creek flooded and washed out the bridge on East Pryor Road between Edgar and Pryor. Blue Water Creek east of Bridger flooded and washed out a county road as well. The heavy rainfall also resulted in water running over the spillway at Cooney Dam. This resulted in several homes flooded along Red Lodge Creek. On May 25th, significant flooding was reported in the town of Joliet as debris backed up Rock Creek resulting in evacuations. At the peak of this flooding, Highway 212 was closed from Rockvale to Red Lodge as 18 inches of water was reported on Highway 212 through the town of Joliet. Fifty homes flooded in the area and seven people, mainly elderly, had to leave with the assistance of the fire and sheriff's offices. The Joliet Motel reported a foot of water in each of their rooms. In addition, an 84-year-old woman drowned after she fell into a flooded ditch

near her house. She was going to get her newspaper when she slipped and fell. The woman was swept a short distance downstream from her house near Boyd, where authorities found her body. Damage estimates based on FEMA reviews and Individual Assistance approvals, and totaled in excess of \$1 million.

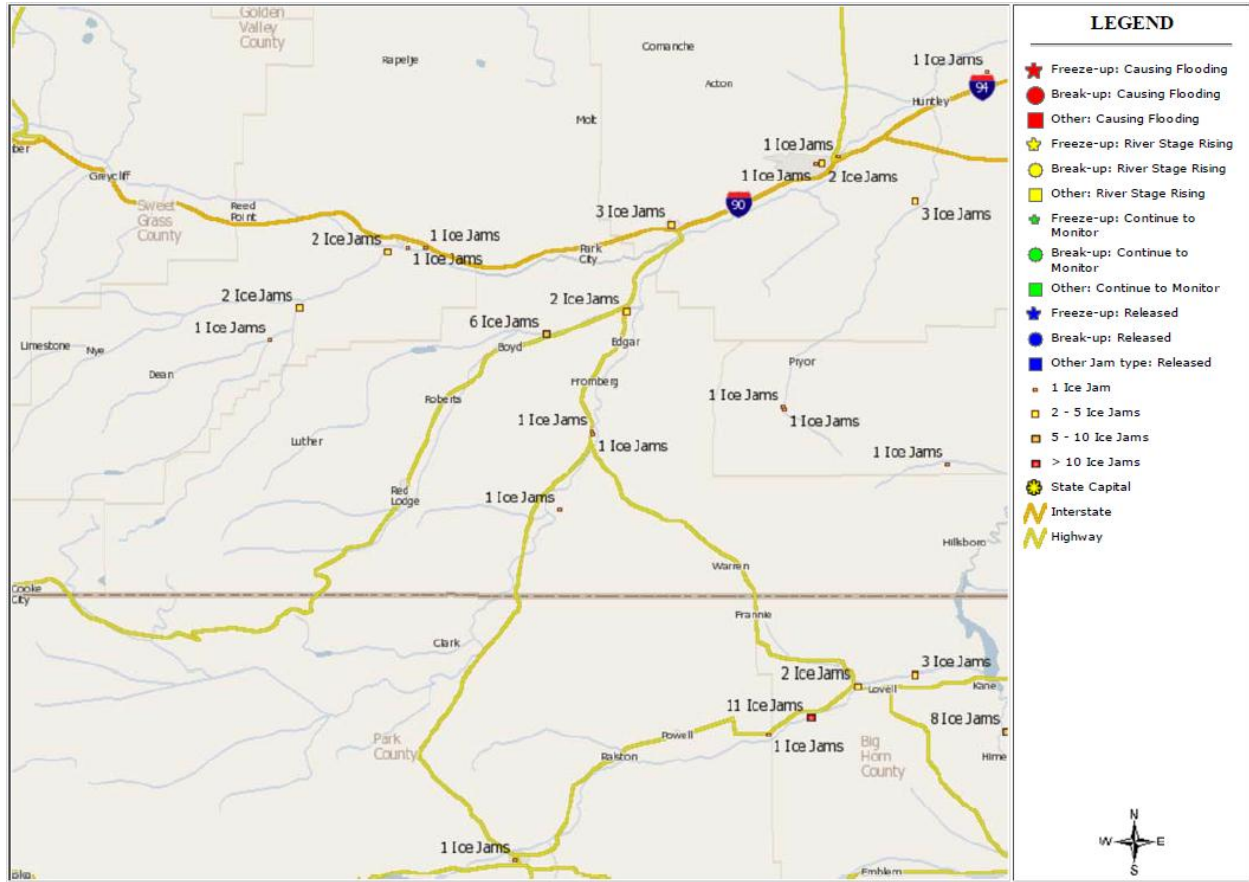
On June 29, 2011, Carbon County officials reported flooding along Rock Creek near 2 Mile Road which resulted in 2 Mile Road north of Red Lodge being closed. In addition, Rock Creek in Red Lodge rose above flood stage on the 29th and continued above flood stage through the end of the month. The river crested at 7.78 feet on the 29th.

On July 1, 2011 flooding occurred 2 miles NE of Fox. Although no significant synoptic spring system moved across the Billings forecast area, warm late June and early July temperatures resulted in rapid mountain snow melt runoff and flooding. Flooding from June continued into July along Rock Creek near Two Mile Road. Emergency repairs were needed on the Two Mile Bridge (which was closed) north of Red Lodge. Rock Creek was also reported to have cut a new channel and was as high as it has ever been. As a result, residents in 4 to 5 homes were stranded in the Fox area about 6 miles north of Red Lodge. In addition, another 3 homes were under water in the Wagon Wheel Estates which is about 3 miles north of Red Lodge. Western Ranch Estates near Roberts was flooded. In addition, Grapevine and Cottonwood Roads near Silesia were closed. Rock Creek at Red Lodge rose above flood stage on the 5th and continued to run above flood stage through the 7th. The creek crested at 7.54 feet on the 5th and again at 7.69 feet on the 6th.

On July 6, 2011, a slow moving thunderstorm produced heavy rain and large hail across portions of Carbon and Stillwater Counties, especially the Red Lodge area. The Red Lodge fire chief reported water one foot deep flowing down the streets. No fatalities or injuries were attributed to this storm. Property damage and crop damage estimates were unavailable.

Flooding from ice jams is a hazard in the County. The U.S. Army Corps of Engineers Cold Regions Research and Engineering Laboratory (CRREL) maintains records of ice jams. Not all towns in the County are included in the database (and not all ice jams are recorded). The CRREL data base indicates 11 ice jams in the County between 1936 and 1971. Historic ice jams in the County are shown in Figure 3.16.

**Figure 3.16. Historic Ice Jams in Carbon County**

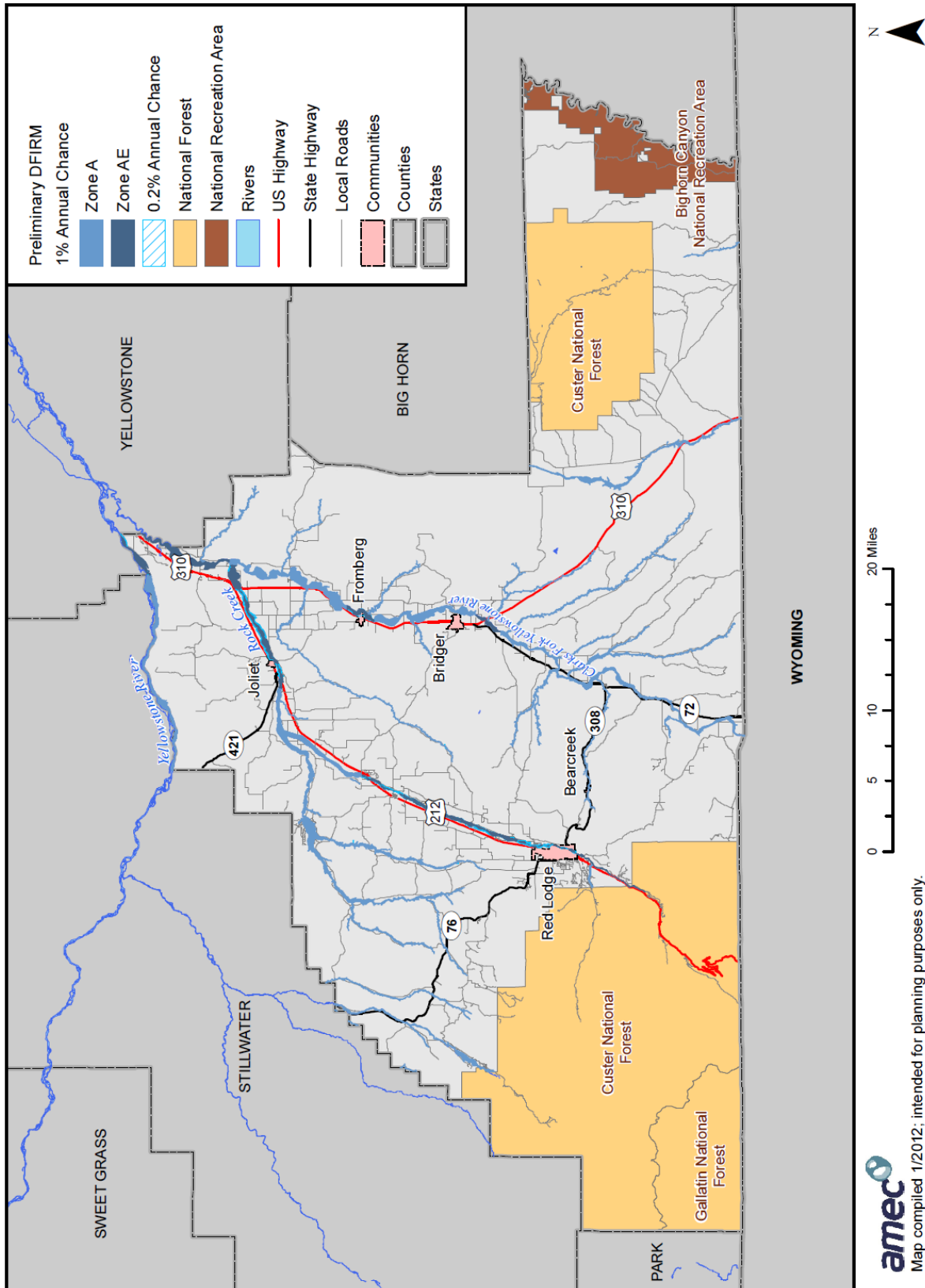


Source: <https://rsgis.crrel.usace.army.mil/icejam/>

There have been two Federal Disaster Declarations for flooding in Carbon County since 1974. Just under \$4 million dollars in federal assistance was provided for flooding in 1978 that occurred in 8 counties including Carbon County. Almost \$8 million was provided by local, state, and federal governments for flooding in 1997 covering 22 counties and one reservation including Carbon County.

Ice jams have occurred in Carbon County, in both the Clarks Fork and Rock Creek drainages. In the 1960's an ice jam took out the Highway 72 bridge south of Belfry. (Darrel Krum, County DES Coordinator)

Figure 3.17. Carbon County Flood Zones



## Likelihood of Future Occurrences

Overall, the probability of a flood event (both major and flash flooding) occurring in any given year is likely. NCDC has reported 9 events between 1993 and 2011. This equates to a flood event in the County every other year. There are no repetitive loss structures in the county.

## Vulnerability

Based upon discussion at the December 9, 2004 meeting, the PDM Steering Committee believed that Carbon County was not particularly vulnerable to flooding. At the time of that discussion, the county had been in a prolonged drought. The county does in fact experience frequent flooding from flash floods, sheeting over saturated or frozen ground, and rivers. The flooding rarely causes significant damage.

This position is based upon the severity of previous floods, and the relatively limited amount of property and infrastructure located in the floodplains of the Clarks Fork and Rock Creek Rivers, the primary waterways in the County. Exceptions to this general position include several short stretches of the Clarks Fork River between Bridger and Fromberg that are subject to winter ice jam flooding and a small section of Rock Creek where it passes next to Joliet. A bridge that carries not only traffic, but communications infrastructure crosses Rock Creek east of Joliet. To the best recollections of the Steering Committee members and others present for the discussion, previous flash floods, with few exceptions, have caused minimal damage and occurred only at great intervals.

All involved in the preparation of this plan are in agreement that the most serious flood risk in the County occurs when high seasonal runoff, rapid snowmelt due to warm temperatures, and a heavy, prolonged precipitation event occur at the same time. History in the County bears out that these events have generally been the costliest in terms of damage to and loss of property and livestock.

Portions of Red Lodge and Joliet are located within the 100-year floodplain of Rock Creek, and portions of Bridger and Fromberg are located in the 100-year floodplain of the Clarks Fork River. Granitic soils in the southern end of the County are quite porous, but soils throughout the County have the possibility of becoming saturated as occurred in May 2005. Basement flooding and minor scouring occurred in Roberts, Joliet, and Red Lodge when rain and snow fell on already-saturated ground. This combination of circumstances could occur again in any part of the County during the late spring and early summer months.

Damage of structures is likely during flooding. Flooding can wash away supporting fill, infiltrate basements, damage contents, and in worst cases wash structures off their foundations. The primary structures at risk from floods in the County are residences and water and sewage treatment facilities. Portions of the transportation infrastructure, county roads and culverts, and county and state highway bridges could be at risk as well. It is possible future development could be at risk from flooding, most likely flash



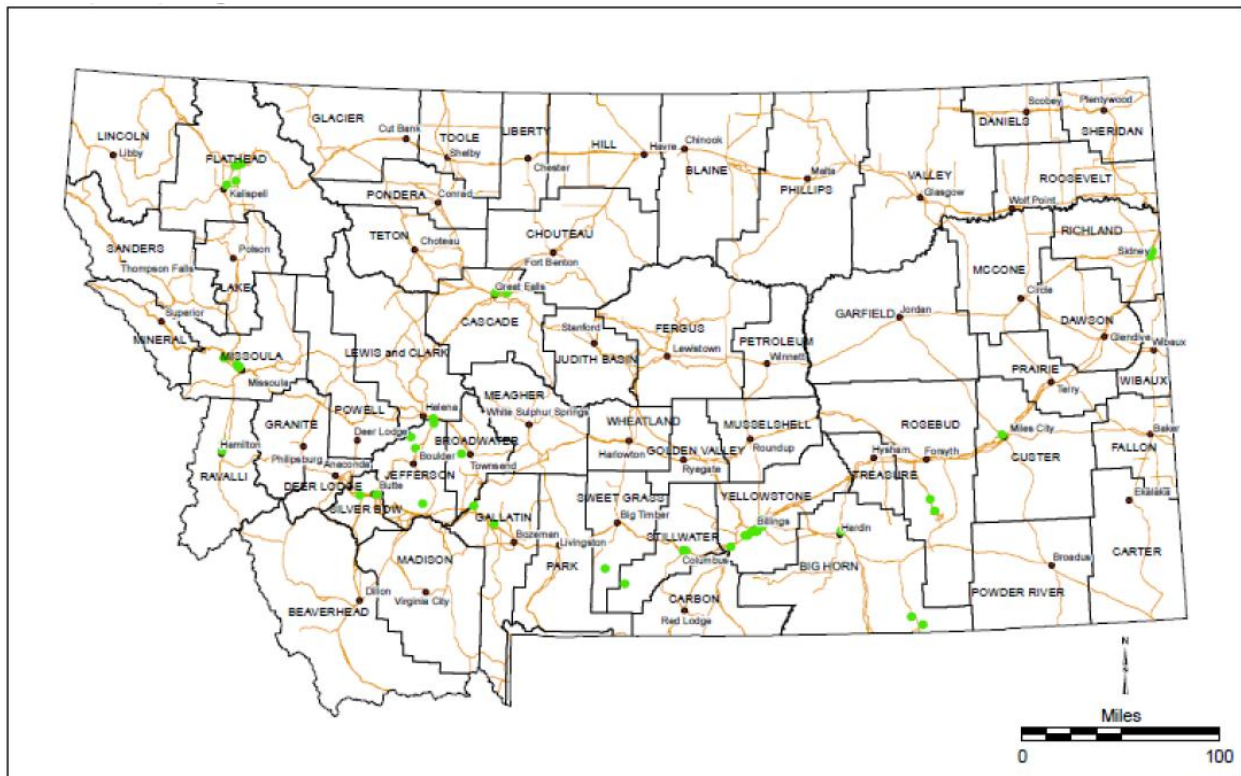
flooding. No specific development has been proposed in any of the delineated floodplains at this time Carbon County participates in the National Flood Insurance Program and regulates construction in the flood plain, but this does not provide a guarantee that future floods will not damage structures and/or infrastructure.

## **Hazardous Material Incident**

Hazardous materials are chemical substances, which if released or misused can pose a threat to the environment or health. Hazardous materials come in the form of explosives, flammable and combustible substances, poisons, and radioactive materials. These substances are often released as a result of transportation accidents or because of chemical accidents in plants or facilities storing hazardous materials. The volume and type of hazardous materials that flow into, are stored, and flow through communities determine exposure to a potential release of hazardous materials.

Although Carbon County has no Interstate Highway, hazardous materials move within and through the County on state highways, on Burlington Northern Santa Fe (BNSF) railroad tracks, and within pipelines. A variety of hazardous materials are used or transported in the County. Among those materials used or generated locally are gasoline and oil, fertilizers, mine explosives, medical waste, and weed spraying chemicals. The County is also traversed by oil and gas pipelines. These pipelines access production areas, provide local service and provide long distance transport. The largest of these lines pass through the Clarks Fork Valley. Figure 3.18 shows the TRI facilities as well as the highway and railroad network through the state.

**Figure 3.18. Hazardous Materials Transportation Routes and Toxic Release Facilities**



March, 2010



- Toxic Release Facility
- County Boundary
- County Seat
- Hazardous Materials Corridor (Buffered 0.25 mile)

**Hazardous Materials within Montana**  
**Montana Disaster and Emergency Services**

Source: 2010 Update to the State of Montana Multi-Hazard Mitigation Plan

### Historic Occurrences

The Montana Department of Environmental Quality maintains records of hazardous material discharges and spills. The County has sites where hazardous materials are present. The County Weed Control District in Joliet is an active generator. The majority of hazardous waste created in the County is used oil. The National Response Center lists 36 spills from 1991 through 2010. The types of spills include fixed (19), pipeline (11), storage tank (3), mobile (2), and railroad (1). ([http://www.nrc.uscg.mil/apex/wwv\\_flow.accept](http://www.nrc.uscg.mil/apex/wwv_flow.accept))

The 2010 Update to the State of Montana Multi-Hazard Mitigation plan reported that one of the largest hazard material spills in the State occurred in Belfry on June 10, 2005. 270 barrels of crude oil were spilled from a fixed facility.

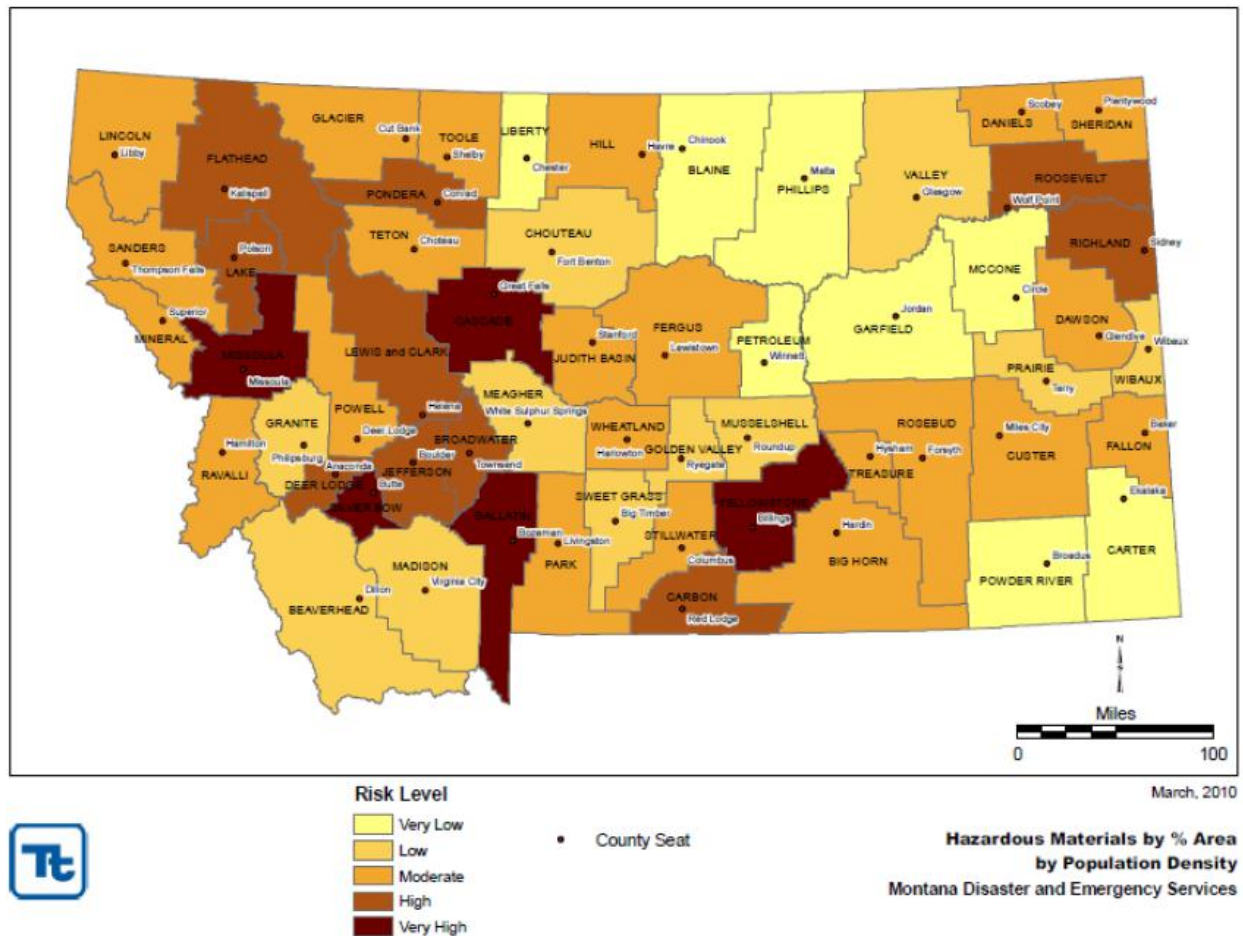
### Likelihood of Future Occurrences

Due to the number of past events (36 events in 20 years), coupled with the location of pipelines and hazardous materials routes that traverse the County, the likelihood of future occurrence of hazardous materials spills is high.

## Vulnerability

The County is vulnerable to a hazardous material incident by simple virtue of the presence of the hazardous materials. However, the amounts of waste generated and stored within the County are small and the materials not particularly toxic. According to the 2010 Update to the State of Montana Multi-Hazard Mitigation Plan, Carbon County has a high vulnerability (see Figure 3.19). There are, however, two scenarios in which major incidents could occur in the County. The first would involve a pipeline rupture creating an extensive oil spill. The other possibility, and the one analyzed later in this chapter with respect to potential for damage would involve a railroad accident with hazardous material spill. Vehicle hazardous material spills are most likely to occur along the major highways, 212, 310, and 78. These highways pass through each of the communities in the County. Hazardous material spills are unlikely to directly affect structures or infrastructure.

**Figure 3.19. Montana Hazardous Material Risk and Population Density by County**



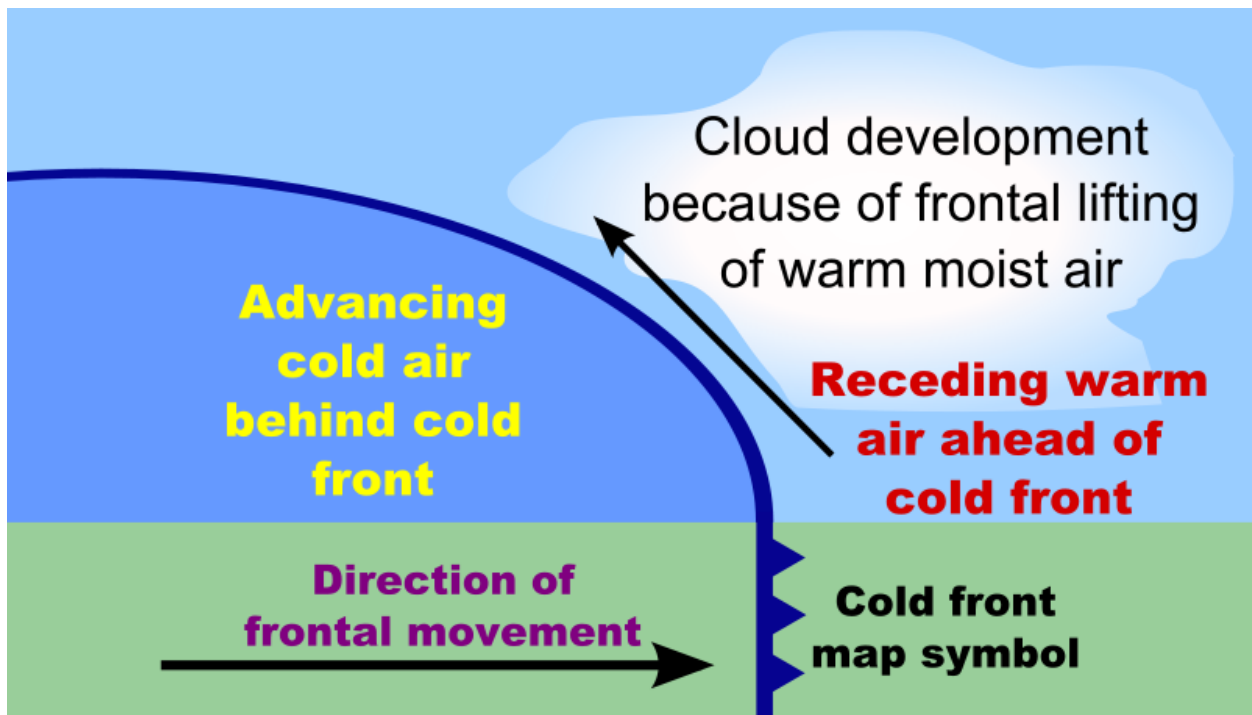
Source: 2010 Update to the State of Montana Multi-Hazard Mitigation Plan

## Hail, Severe Thunderstorms, and Wind

### Severe Thunderstorms

Thunderstorms result from the rapid upward movement of warm, moist air (see Figure 3.20). They can occur inside warm, moist air masses and at fronts. As the warm, moist air moves upward, it cools, condenses, and forms cumulonimbus clouds that can reach heights of greater than 35,000 ft. As the rising air reaches its dew point, water droplets and ice form and begin falling the long distance through the clouds towards earth's surface. As the droplets fall, they collide with other droplets and become larger. The falling droplets create a downdraft of air that spreads out at Earth's surface and causes strong winds associated with thunderstorms.

**Figure 3.20. Formation of a Thunderstorm**



Source: NASA. [http://rst.gsfc.nasa.gov/Sect14/Sect14\\_1c.html](http://rst.gsfc.nasa.gov/Sect14/Sect14_1c.html)

There are four ways in which thunderstorms can organize: single cell, multicell cluster, multicell lines (squall lines), and supercells. Even though supercell thunderstorms are most frequently associated with severe weather phenomena, thunderstorms most frequently organize into clusters or lines. Warm, humid conditions are favorable for the development of thunderstorms. The average single cell thunderstorm is approximately 15 miles in diameter and lasts less than 30 minutes at a single location. However, thunderstorms, especially when organized into clusters or lines, can travel intact for distances exceeding 600 miles.

Thunderstorms are responsible for the development and formation of many severe weather phenomena, posing great hazards to the population and landscape. Damage

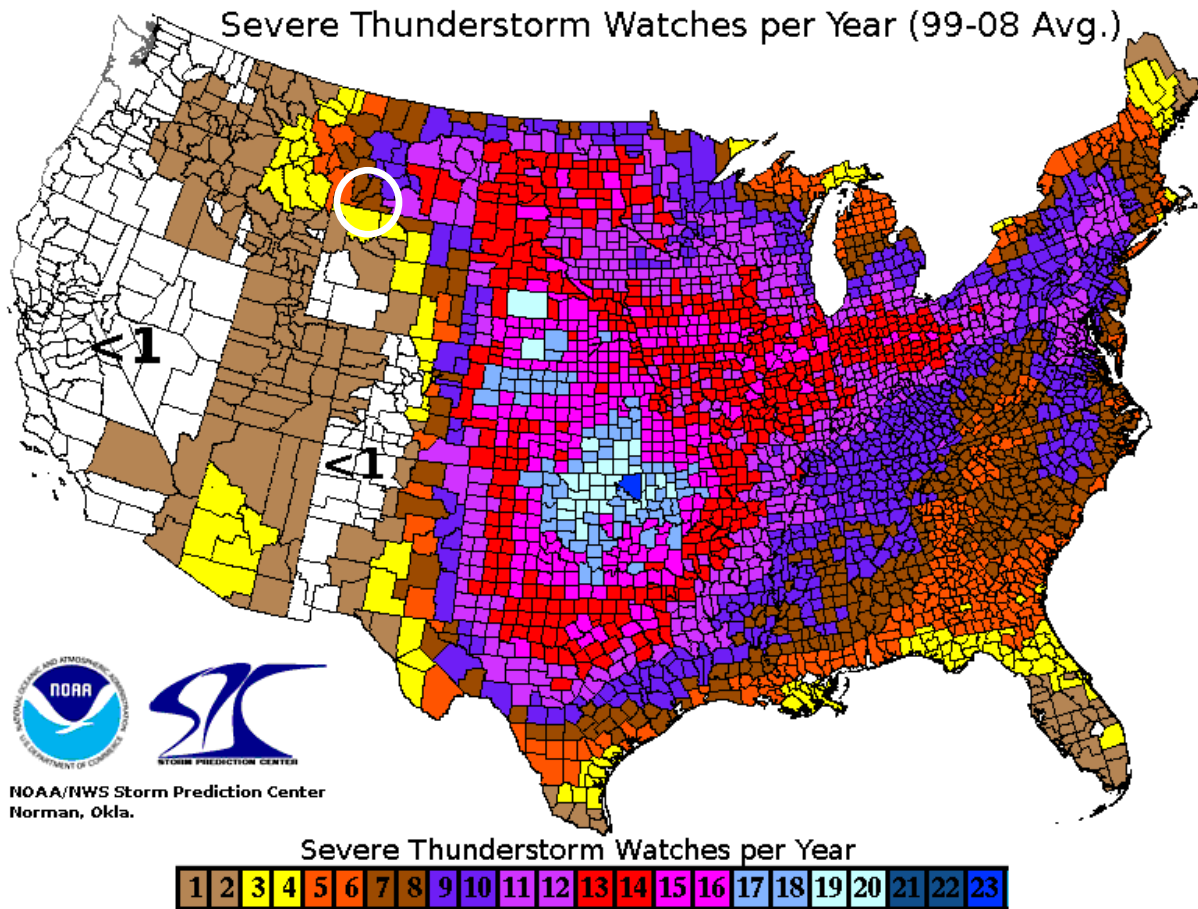
that results from thunderstorms is mainly inflicted by downburst winds, large hailstones, and flash flooding caused by heavy precipitation. Stronger thunderstorms are capable of producing tornadoes and waterspouts.

The National Weather Service issues two types of alerts for severe thunderstorms:

- A **Severe Thunderstorm Watch** indicates when and where severe thunderstorms are likely to occur. Citizens are urged to watch the sky and stay tuned to NOAA Weather Radio, commercial radio, or television for information. Severe Thunderstorm Watches are issued by the Storm Prediction Center in Norman, OK.
- A **Severe Thunderstorm Warning** is issued when severe weather has been reported by spotters or indicated by radar. Warnings indicate imminent danger to life and property to those in the path of the storm. Severe Thunderstorm Warnings are issued by the National Weather Service in Billings.

The County sees 7-8 severe thunderstorm watches per year. This can be seen in Figure 3.21.

**Figure 3.21. Severe Thunderstorm Watches per Year in the Planning Area**



Source: NOAA/NWS Storm Prediction Center



Flash floods often result from the heavy rainfall of thunderstorm systems and nationally are considered the number one thunderstorm-related killer because they often occur at night and people in affected areas may not be able to see the extent of the rapidly rising water before it is too late to escape. Drivers attempting to cross flood-covered sections of roadways can be swept into deeper water and perish. During daylight hours, children playing in flooded drainage canals and ditches are particularly vulnerable to drowning in flash floods. Flash flooding and flooding from accumulations of rainwater from thunderstorms are addressed in depth in the flooding section above.

## Hail

Hail is associated with thunderstorms that can also bring high winds and tornados. It forms when updrafts carry raindrops into extremely cold areas of the atmosphere where they freeze into ice. Hail falls when it becomes heavy enough to overcome the strength of the updraft and is pulled by gravity towards the earth. Hailstorms occur throughout the spring, summer, and fall in the region, but are more frequent in late spring and early summer. Hailstones are usually less than two inches in diameter and can fall at speeds of 120 mph. Hail causes nearly \$1 billion in damage to crops and property each year in the United States. Hail is also one of the requirements which the National Weather Service uses to classify thunderstorms as 'severe.' If hail more than 3/4 of an inch is produced in a thunderstorm, it qualifies as severe.

The National Weather Service classifies hail by diameter size, and corresponding everyday objects to help relay scope and severity to the population. Table 3.9 indicates the hailstone measurements utilized by the National Weather Service.

**Table 3.9. Hailstone Measurements**

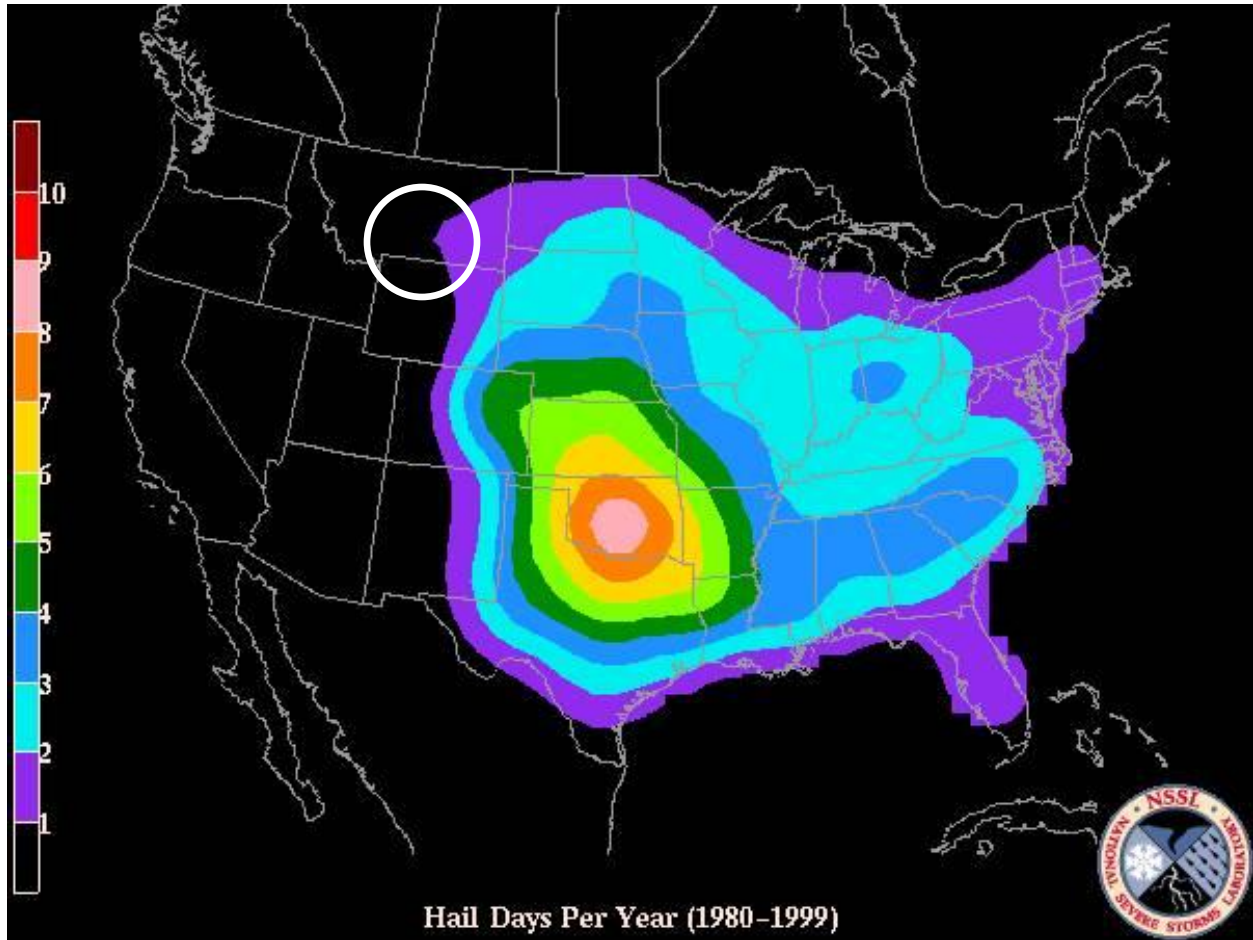
Average Diameter	Corresponding Household Object
.25 inch	Pea
.5 inch	Marble/Mothball
.75 inch	Dime/Penny
.875 inch	Nickel
1.0 inch	Quarter
1.5 inch	Ping-pong ball
1.75 inch	Golf-Ball
2.0 inch	Hen Egg
2.5 inch	Tennis Ball
2.75 inch	Baseball
3.00 inch	Teacup
4.00 inch	Grapefruit
4.5 inch	Softball

Source: National Weather Service

There is no clear distinction between storms that do and do not produce hailstones. Nearly all severe thunderstorms probably produce hail aloft, though it may melt before reaching the ground. Multi-cell thunderstorms produce many hailstones, but not usually the largest hailstones. In the life cycle of the multi-cell thunderstorm, the mature stage is relatively short so there is not much time for growth of the hailstone. Supercell thunderstorms have sustained updrafts that support large hail formation by repeatedly lifting the hailstones into the very cold air at the top of the thunderstorm cloud. In general, hail 2 inches (5 cm) or larger in diameter is associated with supercells (a little larger than golf ball size which the NWS considers to be 1.75 inch.). Non-supercell storms are capable of producing golf ball size hail.

In all cases, the hail falls when the thunderstorm's updraft can no longer support the weight of the ice. The stronger the updraft the larger the hailstone can grow. When viewed from the air, it is evident that hail falls in paths known as hail swaths. They can range in size from a few acres to an area 10 miles wide and 100 miles long. Figure 3.22 shows the average number of days of hail per year in the United States, with the planning area outlined in a white oval. Figure 3.23 shows the average number of days of severe hail (over two inches in diameter) per year in the United States, with the planning area outlined in a white oval.

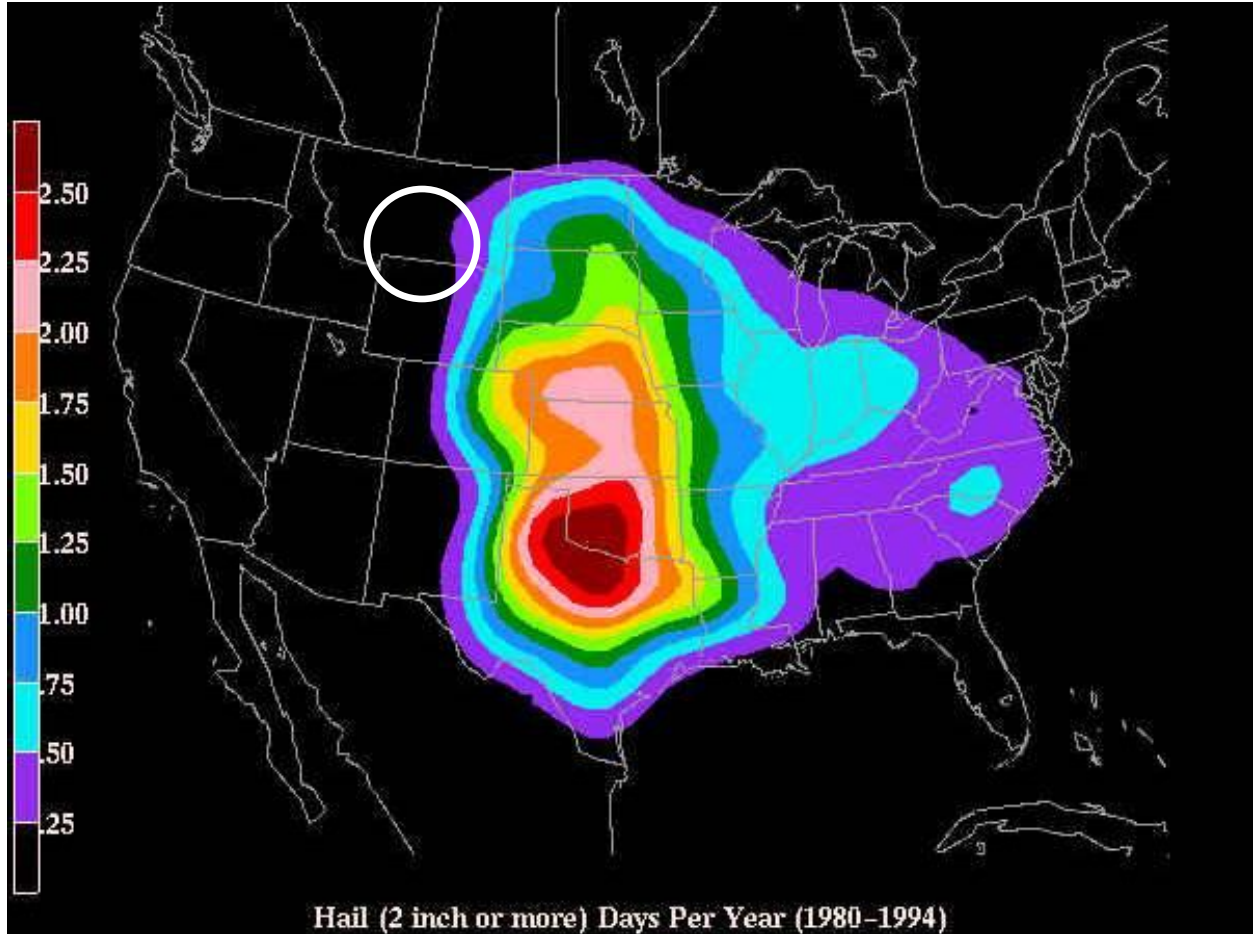
Figure 3.22. Average Number of Days of Hail per Year



Source: NOAA National Severe Weather Laboratory



Figure 3.23. Average Days of Large Hail in the Planning Area



Hail is a frequent occurrence in Carbon County. Depending on the size of the hail and the seasonal timing of the storm, hail can cause crop damage, property damage, vehicle accidents, and personal injury. Thunderstorms are common as well and are often accompanied by strong winds and electrical activity. These types of storms generally occur from May through September.

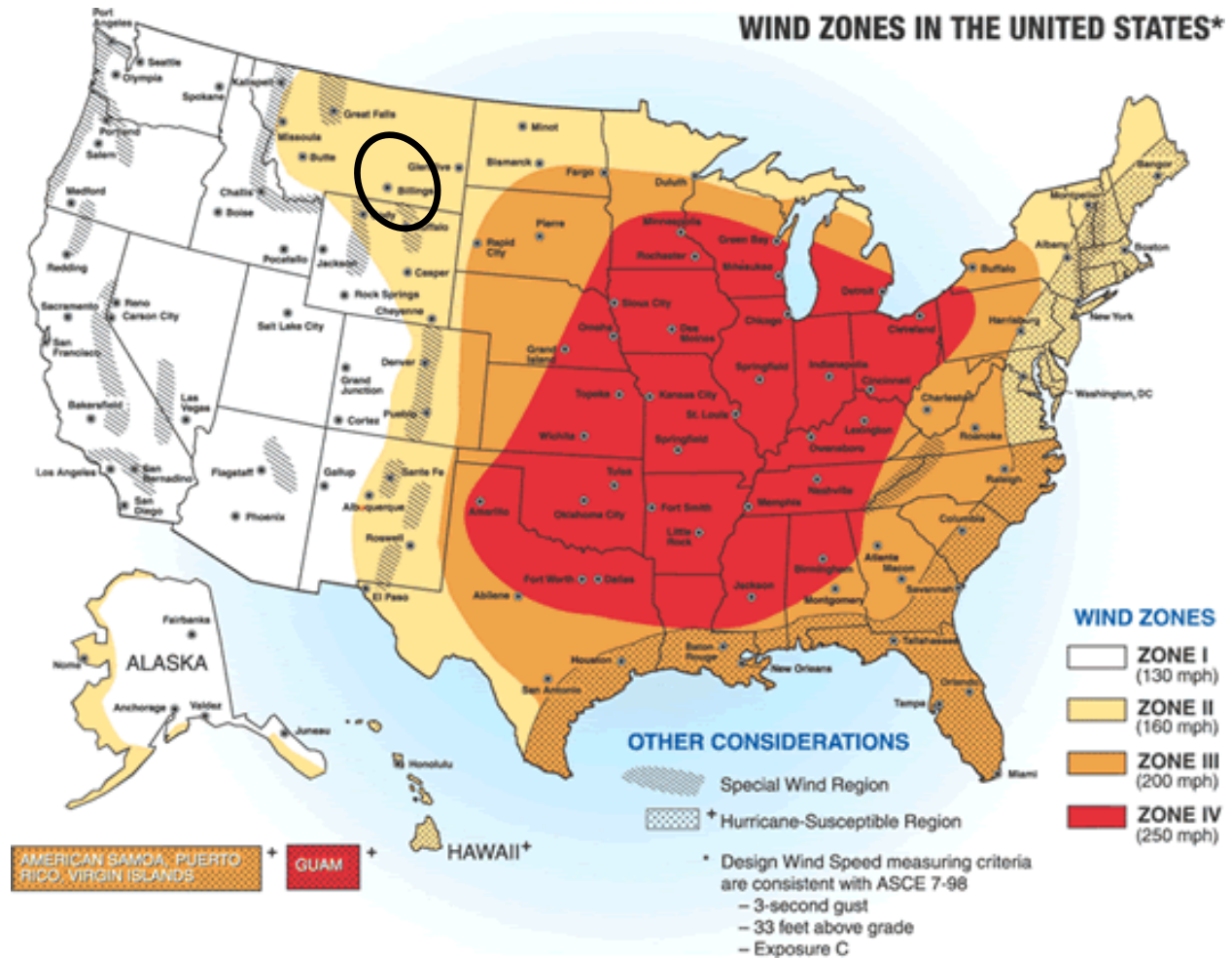
### Wind

In addition to tornadoes, the County is subject to significant, non-tornadic (straight-line), winds. High winds, as defined by the NWS glossary, are sustained wind speeds of 40 mph or greater lasting for 1 hour or longer, or winds of 58 mph or greater for any duration.” These winds may occur as part of a seasonal climate pattern or in relation to other severe weather events such as thunderstorms. Straight-line winds may also exacerbate existing weather conditions, as in blizzards, by increasing the effect on temperature and decreasing visibility due to the movement of particulate matters through the air, as in dust and snow storms. The winds may also exacerbate fire conditions by drying out the ground cover, propelling fuel, such as tumbleweeds, around the region, and increasing the ferocity of existing fires. These winds may damage crops,

push automobiles off roads, damage roofs and structures, and causes secondary damage due to flying debris.

Figure 3.24 depicts wind zones for the United States. The map denotes that the majority of the County falls into Zone II, which is characterized by high winds of up to 160 mph. The far southern edge of the County borders on Zone III, characterized by high winds of up to 200 mph.

**Figure 3.24. Wind Zones in the United States**



Source: Federal Emergency Management Agency

Table 3.10 shows the Beaufort Wind Scale. The replication of the scale only reflects land-based effects.

**Table 3.10. The Beaufort Wind Scale**

Beaufort Number	Description	Windspeed (MPH)	Land Conditions
0	Calm	<1	Calm. Smoke rises vertically.
1	Light air	1 – 3	Wind motion visible in smoke.
2	Light breeze	3 – 7	Wind felt on exposed skin. Leaves rustle.
3	Gentle breeze	8 – 12	Leaves and smaller twigs in constant motion.
4	Moderate breeze	13 – 17	Dust and loose paper raised. Small branches begin to move.
5	Fresh breeze	18 – 24	Branches of a moderate size move. Small trees begin to sway.
6	Strong breeze	25 – 30	Large branches in motion. Whistling heard in overhead wires. Umbrella use becomes difficult. Empty plastic garbage cans tip over.
7	High wind, Moderate gale, Near gale	31 – 38	Whole trees in motion. Effort needed to walk against the wind. Swaying of skyscrapers may be felt, especially by people on upper floors.
8	Gale, Fresh gale	39 – 46	Some twigs broken from trees. Cars veer on road. Progress on foot is seriously impeded.
9	Strong gale	47 – 54	Some branches break off trees, and some small trees blow over. Construction/temporary signs and barricades blow over. Damage to circus tents and canopies.
10	Storm, Whole gale	55 – 63	Trees are broken off or uprooted, saplings bent and deformed. Poorly attached asphalt shingles and shingles in poor condition peel off roofs.
11	Violent storm	64 – 72	Widespread vegetation damage. Many roofing surfaces are damaged; asphalt tiles that have curled up and/or fractured due to age may break away completely.
12	Hurricane	≥ 73	Very widespread damage to vegetation. Some windows may break; mobile homes and poorly constructed sheds and barns are damaged. Debris may be hurled about.

Source: National Oceanographic and Atmospheric Association, <http://www.spc.noaa.gov/faq/tornado/beaufort.html>

### Historic Occurrences

Gilbert Brown of Bridger remembered an extreme localized hail storm in June of 1957. Although the storm lasted only 30 minutes, he recalled that windows were broken in his house, shingles were torn from the roof, and the wheat crop was knocked down. The storm moved from the northwest to the southeast damaging a narrow swath. Interviews with other long-time residents did not yield recollections of severe summer storms.

The NCDC has recorded 72 hail events and 19 thunderstorm events in the County in Storm Data since 1950. More storms may have gone unrecorded. Hail storms are very frequent events in the County that are usually localized and short-lasting. The SHELDUS data shows 12 records for hail and severe thunderstorms during the years 1961(2), 1964, 1968, 1970, 1973, 1975 (3), 1982, 1986, and 1991. Total property and crop damages from these storms were \$76,095 and \$199,167 respectively. In May of

2011, an elderly woman died of drowning near Boyd as a result of a severe thunderstorm.

The Carbon County News reported on a hail storm that struck near Red Lodge on July 13, 2011. Golf ball sized hail struck, leaving a trail of dented vehicles, damaged roofs, shredded trees, smashed skylights, and killed plants. Manhole covers rattled under the pressure, and driving and walking were nearly impossible during the storm. Several hundred roofs in and around Red Lodge have been and are still being replaced because of this hail storm. There was also extensive damage to vehicles including broken windows and severe denting to car bodies.

### Likelihood of Future Occurrence

Heavy rain, thunderstorms, and hail are well-documented seasonal occurrences that will continue to occur annually in the County. The Soil Survey published by the Soil Conservation Service reports that "Hail of damaging strength or size occurs about 1 year in 10 at lower elevations."

### Vulnerability

All areas of the County are potentially vulnerable to severe thunderstorms and hail events. Severe summer storms can cause a variety of damage. Hail and high winds can damage crops, structures, vehicles, landscaped vegetation, and stands of timber. Heavy precipitation can also cause structural damage. Human and animal deaths have happened in the past and could in the future result from severe summer storms.

## **Winter storms**

Winter storm hazards present one of the greatest threats to life of any hazard in Montana. Statistics on winter deaths are difficult to obtain, but nationwide there are on average 100 lives directly and indirectly lost to winter weather, more than lightning, hurricanes, or tornadoes. Winter storms are considered to be deceptive killers because most deaths are indirectly related to the storm. People die in traffic accidents on snow- or ice-covered roads, from hypothermia due to prolonged exposure to cold, and from heart attacks due to overexertion. About 70 percent of the winter deaths in the U.S. occur in automobiles and nearly 25 percent are from people caught out in the storm (NOAA, 2001).

Most Montana residents are readily prepared for snow storms each winter. Every community receives snow on an annual basis, so residents expect measurable snow several times each winter. Cold temperatures into the negative numbers are also common throughout the winter months. Major problems typically only occur during record snowfalls and extended periods of below zero temperatures. Rapid snowfall can overwhelm the plowing resources, making roadways impassable, and severely reduce visibility. Particularly heavy snows, early or late season snows, and ice events can damage infrastructure such as power lines, and block roads or damage structures with downed trees. Extended cold periods, especially when coupled with strong winds, can

create dangerous situations for those outdoors or those without heat, such as in the case of a utility disruption.

Winter storms are generally slow in developing, often taking one to three days to mature. This does not in any way diminish their importance, nor their potential for causing loss of life and destruction. What it does mean is that the National Weather Service is often able to provide advance notice of winter storms, in some cases, lead times of one to two days.

Blizzards and ice storms occur in Carbon County. A blizzard is defined as a storm with winds over 35 miles per hour with snow and blowing snow reducing visibility to near zero. Blizzards and ice storms pose a great threat to human life, livestock, and wildlife in Carbon County, and in Montana. As evidenced by the failure to recall severe winter storms, residents of the County are accustomed to dealing with winter storms. However, rapid snowfall, extremely low temperatures, and/or strong winds can combine to present especially dangerous conditions.

### Historic Occurrences

Beartooth Times February 13, 1936 headlines read “Old Man Winter Still in Control.” “The present spell now well into its third week, is the most severe experienced in the state in several years.” Snowfall was heavy and temperatures were well below zero. “The coldest registered in Bridger was 32 below zero, with many readings from 26-30 below.” The Carbon County News reported the following week that “game birds were dying from the cold snap” due to sub-zero temperatures and deep snow. (February 19, 1936) Reuben Steinmetz recalled riding his horse from Montaqua to Rockvale in the storm and freezing his face in the cold. He reported that numbers of wildlife succumbed to the cold temperatures.

Long-time resident, Bob Moran, recalled a heavy snow in the 1940’s that crushed the roof on the Bull and Bear in downtown Red Lodge. Jim Yedlicka in the Clarks Fork Valley recalled that there were a number of winter storms in the 1940s that caused power outages. The Carbon County News reported on a number of severe winter weather events in 1949. First, January 1949 was the coldest since 1937. Second, the News reported “High Wind Hits Red Lodge Area.” The February 10<sup>th</sup> edition reported that a warm wind from the south melted snow and left glazed sidewalks, stalled cars, a bus and trucks blown into ditches, and snow drifts that made the roads impassable. Just a week later the News again reported that wind and snow had caused 250 miles of road in the north end of the County to be blocked by drifts.

In April of 1955 Carbon County News reported that “Carbon County is Snowbound for Two Days. (April 7, 1955) The article further stated that streets and roads were being reopened and “little serious hardship was reported.” This despite the fact that there was an 8 foot snowdrift across Highway 212 one mile south of Red Lodge and roads throughout the County were blocked. “Some farmers expected lambing and calving losses, and few were caught with a short supply of feed.” Drifts on the Washoe Hill were 8-10 feet, cars were stranded, people were marooned, schools closed, drill rigs

shut down, funerals postponed, a greenhouse was damaged, the telephone exchange was swamped with calls, and there was power failure throughout Red Lodge. The article concluded that "There were few reports of acute suffering, although there were tales of heroism as in any disaster." Howard Brown recalled losing stock, lambs, that winter and also losing power. "The whole County was blanketed, Rockvale got 48 inches and the roads in the Clarks Fork Valley were all closed." Reuben Steinmetz recollected four feet of snow at Silesia. With the road to Red Lodge closed, people stayed at Fort Rockvale. The snow came for three days solid and produced huge drifts. Calves were lost.

An ice storm in the late 1960's knocked out power to the town of Fromberg for four days. Rural areas were without power for 5 to 6 days. Heavy ice-coated power lines went down and even broke the power poles off according to rancher, Jim Yedlicka.

According to the Carbon County News on January 20, 1972, the blizzard of 1972 created power outages, buried fire hydrants in Red Lodge, and caused a myriad of vehicle accidents due to poor visibility. Red Lodge was nicknamed "White Lodge" during the winter of 1971-72 as a result of a series of major winter storms that swept through one after the other. The News reported on February 3 and 17 that snowfall in Red Lodge in January was 62.5 inches and the snow depth was 180% of average. According to the Soil Conservation Service, water content of the snow was 207% of average. An April storm in 1973, reported in the April 26, 1973 Carbon County News, knocked down utility poles between Billings and Joliet by the hundreds and dumped drifts of six feet in Red Lodge. The utility companies struggled to respond, but the ski area enjoyed an extra three days of skiing.

January 1984 produced a storm with record snowfall, 73 inches in one storm, according to former County Commissioner, Frank Cole. "We had winters, winters, winters. People couldn't get to their haystacks, ran out of fuel, and we had to deliver fuel."

On February 24, 1994, two storms hit the state. A Pacific storm moved in from the West with an Arctic front which moved southward out of Alberta behind the Pacific Front. The storm first hit Northwest Montana early on the 23rd and moved into Central Montana during the evening and into Eastern Montana early morning on the 24th. Heavy snow...strong winds and bitter cold accompanied the storm across the State. Two feet of snow fell in the mountains with four to eight inches elsewhere. Temperatures dropped below zero at most locations.

A powerful winter storm affected Southern Montana and Northern Wyoming during a three day period from December 26, 2003 through December 28, 2003. A strong arctic front ushered in colder air across the area as a deep trough moved across Montana. A moist southwest flow aloft moved over this cold airmass at the surface and produced a prolonged period of snow across the area. 14 inches of snow fell at Red Lodge.

In March 2007, the intense upper low over Northern Wyoming and Southeast Montana that resulted in the heavy snow and blizzard conditions during the last three days of the month moved into the western Dakotas during the afternoon of the 30th. As it did, a

narrow band of wrap-around moisture moved southwest across portions of South Central Montana. This resulted in moderate to heavy snow across a localized area. 8 inches fell in Bridger with numerous 2-3 foot drifts across many roads.

In October of 2008, a significant snowstorm brought heavy wet and record snowfall to Southern Montana. As an upper low dropped south into southern Nevada Friday, October 10th, before making a turn to the northeast reaching Eastern Montana on October 12th, persistent overrunning and upslope flow brought a long duration snow event to the region. Snowfall began in many areas on the evening of Thursday, October 9th and continued through Sunday, October 12th. The most intense portion of the storm with the heaviest snowfall rates occurred Saturday night October 11th into Sunday morning October 12th as the main upper low ejected out across Montana. With the high water content of the snow, many large tree limbs and power lines were brought down by the weight of the snow. Temperatures were also well below normal for this time of year. The following snow totals were recorded at stations in Carbon County: Cole Creek Snotel 48.8 Roscoe 4SE 45.0 Red Lodge 2S 42.0 Alpine 40.0 Roscoe 6S 38.0 Red Lodge 36.0 Burnt Mountain Snotel 35.3 Red Lodge 4N 32.0 Roberts 5.9NNW 22.9 Belfry 16.0 Red Lodge 9ENE 12.0 Joliet 11.0 Bridger 10.0 Bridger 2N 9.0

A major winter storm moved across South Central Montana on the December 13<sup>th</sup>, 2008. The storm system brought in a period of heavy snow, blowing snow and bitterly cold temperatures. The heaviest snow fell at the time of the strongest winds behind the frontal passage on the 13th, resulting in the greatest impacts. Winds of 25 to 35 mph, with gusts exceeding 50 mph were common, resulting in frequent visibilities at or below a quarter of a mile in many areas. Snowfall amounts were generally in the one to four inch range with locally higher amounts. In addition, bitterly cold temperatures moved into the area for the remainder of the weekend. On the 15th, record low temperatures were reported at some locations as temperatures dropped to around 20 degrees below zero.

On May 5, 2010, a strong Pacific disturbance brought heavy snow along the north and east facing slopes of the Beartooth Mountains, as well as across portions of Southeast Montana. Fishtail to Cole Creek Snotels received anywhere from 17 to 33 inches of snow.

On November 28, 2010, a storm system moved through the Rockies and into the High Plains. Strong upslope flow resulted in accumulating snow in the foothills of the Beartooth and Absaroka Mountains. In addition, bands of moderate snow developed over the Eastern Plains of the Billings Forecast Area. Brisk north winds also caused blowing and drifting snow and poor traveling conditions. Areas around Eastern Carbon County received between 5 and 9 inches of snow.

On April 18, 2011, a strong weather system moved south out of British Columbia and across Idaho into Wyoming. Heavy, wet snow occurred across the upslope areas of the Beartooth and Crazy Mountains. The Red Lodge area received 8-10 inches of snow.



**Figure 3.25. Highway 212 through Red Lodge, December 2004**



### Likelihood of Future Occurrence

Winter storms have a recurrence interval of several times each year in the County.

### Vulnerability

Although there have been no recent state or federal disaster declarations for winter storms for Carbon County, the entire County remains vulnerable to winter storms due to the continental weather patterns. The extent of impact or damage will vary with major winter storm events dependent upon the amount and moisture content of snow, wind speeds, temperature ranges, and the duration of the event. Potential loss calculations found later in the chapter show that even moderate winter storms can have significant economic impact. Humans, livestock, structures, and vegetation are all at risk of damage from winter storms.

## **Tornadoes**

Tornadoes are infrequent, but not unheard-of events in Carbon County. Tornadoes form when cool, dry air sits on top of warm, moist air. Tornadoes are rotating columns of air marked by a funnel-shaped downward extension of a cumulonimbus cloud whirling at destructive speeds of up to 300 mph, usually accompanying a thunderstorm. Tornadoes are the most powerful storms that exist. They can have the same pressure differential across a path only 300 yards wide or less as 300 mile wide hurricanes. Figure 3.26 illustrates the potential impact and damage from a tornado.

**Figure 3.26. Potential Impact and Damage from a Tornado**

Figure 2-2 Potential impact of a tornado

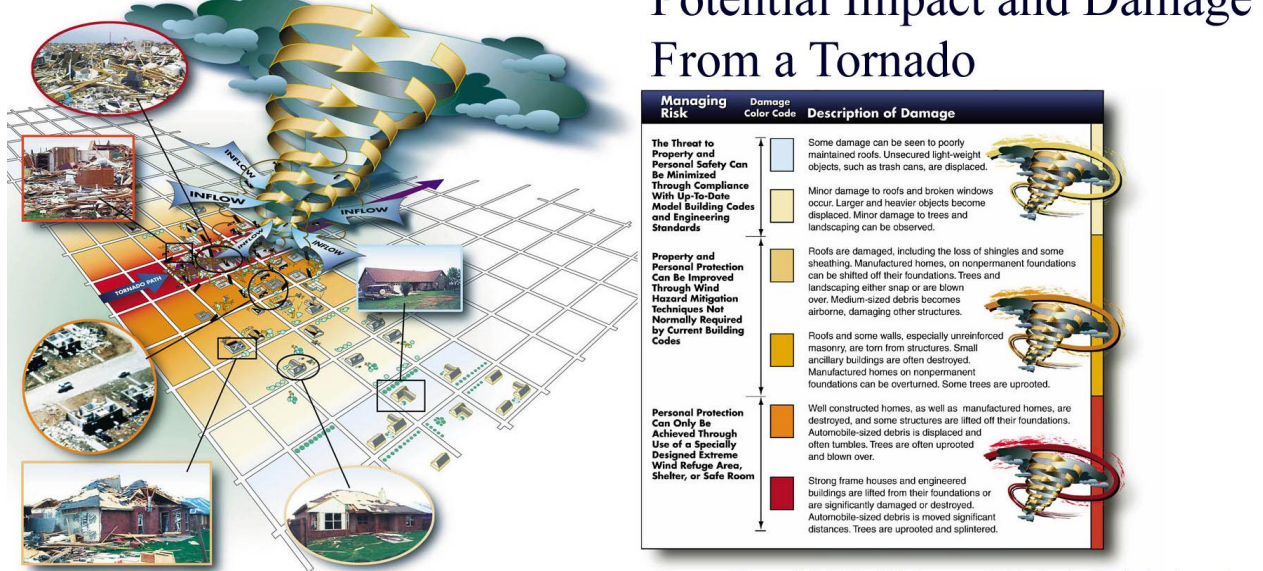


Figure 2-2 Potential damage table for impact of a tornado

Source: FEMA: Building Performance Assessment: Oklahoma and Kansas Tornadoes

Prior to February 1, 2007, tornado intensity was measured by the Fujita (F) scale. This scale was revised and is now the Enhanced Fujita scale. Both scales are sets of wind estimates (not measurements) based on damage. The new scale provides more damage indicators (28) and associated degrees of damage, allowing for more detailed analysis and better correlation between damage and wind speed. It is also more precise because it takes into account the materials affected and the construction of structures damaged by a tornado. Table 3.11 shows the wind speeds associated with the original Fujita scale ratings and the damage that could result at different levels of intensity. Table 3.12 shows the wind speeds associated with the Enhanced Fujita Scale ratings.

**Table 3.11. Original Fujita Scale**

Fujita (F) Scale	Fujita Scale Wind Estimate (mph)	Typical Damage
F0	< 73	Light damage. Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
F1	73-112	Moderate damage. Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
F2	113-157	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
F3	158-206	Severe damage. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown.
F4	207-260	Devastating damage. Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated.

Fujita (F) Scale	Fujita Scale Wind Estimate (mph)	Typical Damage
F5	261-318	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yards); trees debarked; incredible phenomena will occur.

Source: National Oceanic and Atmospheric Administration Storm Prediction Center, [www.spc.noaa.gov/faq/tornado/f-scale.html](http://www.spc.noaa.gov/faq/tornado/f-scale.html)

**Table 3.12. Enhanced Fujita Scale**

Enhanced Fujita (EF) Scale	Enhanced Fujita Scale Wind Estimate (mph)
EF0	65-85
EF1	86-110
EF2	111-135
EF3	136-165
EF4	166-200
EF5	Over 200

Source: National Oceanic and Atmospheric Administration Storm Prediction Center, [www.spc.noaa.gov/faq/tornado/ef-scale.html](http://www.spc.noaa.gov/faq/tornado/ef-scale.html)

Tornadoes can cause damage to property and loss of life. While most tornado damage is caused by violent winds, the majority of injuries and deaths generally result from flying debris. Property damage can include damage to buildings, fallen trees and power lines, broken gas lines, broken sewer and water mains, and the outbreak of fires. Agricultural crops and industries may also be damaged or destroyed. Access roads and streets may be blocked by debris, delaying necessary emergency response.

### Historic Occurrences

According to the NCDC, between 1950 and 2010, Carbon County had 3 tornadoes spotted that were reported. There have no doubt been additional tornadoes present in the County that were not formally reported. Reported tornadoes are shown in Table 3.13.

**Table 3.13. Past Occurrences of Tornadoes in Carbon County**

Location or County	Date	Time	Type	Magnitude	Death	Injuries	Property Damage	Crop Damage
1 CARBON	03/23/1988	1:30 pm	Tornado	F0	0	0	0	0
2 CARBON	05/24/1990	3:00 pm	Tornado	F1	0	0	0	0
3 Warren	06/16/2010	4:00 PM	Tornado	F2	0	0	12,000	0

Source: NCDC

The 2010 Bowler Flats tornado was on the ground for approximately one mile and lasted for five minutes. The tornado destroyed four transmission structures, damaged a transmission pole, shredded two wooden power poles and damaged some fencing. Otherwise, it remained over open areas. The EF-2 damage was based on power and transmission poles being shredded with winds estimated from 111-135 mph.

Although not occurring in the County, an event in nearby Billings on June 20, 2010 does show the damage a City can incur should a tornado strike an urbanized area. Based on the observed damage, the tornado was classified as an EF-2 on the Enhanced Fujita Scale. Wind speeds within an EF-2 tornado range from 111-135 mph, and the associated damage observed at the Billings MetraPark and nearby businesses was consistent with this classification. The damage path was 120 yards wide with a length of about a half mile and on the ground an estimated 12 minutes. The damage assessment and eyewitness accounts indicate that the tornado developed near the intersection of Lake Elmo Drive and Main Street in the Billings Heights at approximately 4:24 pm, with significant EF-2 damage to several nearby businesses. Damage included rooftops being blown off of three structures, windows blown out, power poles downed, business signs and billboards blown down along with several trees uprooted. The tornado appeared to weaken slightly as it progressed southeast across Alkali Creek. Limbs were broken off numerous trees in the vicinity of the creek. The tornadic circulation then appeared to have strengthened once again as it moved south over the Rimrock Auto Arena at Metrapark. EF-2 damage was again observed to the arena with much of the roof blown off along with other damage to the exterior of the building. Debris from the arena impacted other nearby businesses creating additional damage, mainly in the form of broken windows. Debris from the arena was reported landing as far away as a mile from the tornado touchdown. The tornado then dissipated over the arena around 4:36 pm. The associated thunderstorm then moved northeast away from Billings. Numerous sightings of funnel clouds were reported as this storm moved east-northeast of Billings, however no additional tornado touchdowns were reported. In total, \$30,000,000 in damage was attributed to this tornado. Fortunately, no deaths or injuries were reported.

#### Likelihood of Future Occurrence

There have been only three recorded tornadoes in the County since 1955. The historical record is most likely incomplete. Historical tornado activity within the County indicates that the area will likely continue to experience the formation of funnel clouds and weak tornadoes during adverse weather conditions. The actual risk to the County is dependent on the nature and location of any given tornado.

#### Vulnerability

Based upon past tornado/high wind events researched for the 2010 Update to the State of Montana Multi-Hazard Mitigation Plan, Carbon County is not in the top 10 Montana counties for vulnerability to tornadoes. Tornadoes are a relatively infrequent occurrence in the County, as evidenced by the NCDRC data in Table 3.13 above. Structures are at risk from tornadoes. Tornadoes can cause roof, window, and structural damage and in rare cases can demolish buildings and/or lift them off their foundations.

### **Volcanic Activity**

Volcanic eruptions are generally not a major concern in Montana due to the relatively low probability (compared with other hazards) of events in any given year. However, Montana is within a region with a significant component of volcanic activity and has

experienced the effects of volcanic activity as recently as 1980 (the eruption of Mount St. Helens in the state of Washington).

According to the U.S. Geological Survey, Yellowstone National Park has been identified as a prominent hot spot for geologic activity. The hot spot is presumed to exist under the continental crust in the region of Yellowstone National Park and northwestern Wyoming. Large calderas under the park were produced by three gigantic eruptions during the past 2 million years, the most recent of which was approximately 600,000 years ago. That particular volcanic eruption blasted molten rock into the air at 1,000 times the volume of the 1980 Mount St. Helen's eruption subsequently collapsing to create the Yellowstone Caldera (Tracking Changes in Yellowstone's Restless Volcanic System, U.S.G.S. Website). Ash deposits from these volcanic eruptions have been mapped in Iowa, Missouri, Texas, and northern Mexico. Thermal energy from the hot spots fuel hot pools, springs, geysers, and mud pots in the park today. "Recent surveys demonstrate that parts of the Yellowstone region rise and fall as much as 1 centimeter a year, indication the area is still geologically restless. However, these measurable ground movements, which most likely reflect hydrothermal pressure changes, do not necessarily signal renewed volcanic activity in the area." (Kious, Jacqueline and Robert Tilling, *The Dynamic Earth: The Story of Plate Tectonics*, USGS website)

Populations living near volcanoes are most vulnerable to volcanic eruptions and lava flows, although volcanic ash can travel and affect populations many miles away and cause problems for aviation. The USGS notes specific characteristics of volcanic ash. Volcanic ash is composed of small jagged pieces of rocks, minerals, and volcanic glass the size of sand and silt, as shown in Figure 3.27. Very small ash particles can be less than 0.001 millimeters across. Volcanic ash is not the product of combustion, like the soft fluffy material created by burning wood, leaves, or paper. Volcanic ash is hard, does not dissolve in water, is extremely abrasive and mildly corrosive, and conducts electricity when wet.

**Figure 3.27. Ash Particle from 1980 Mt. St Helens Eruption Magnified 200 Times**

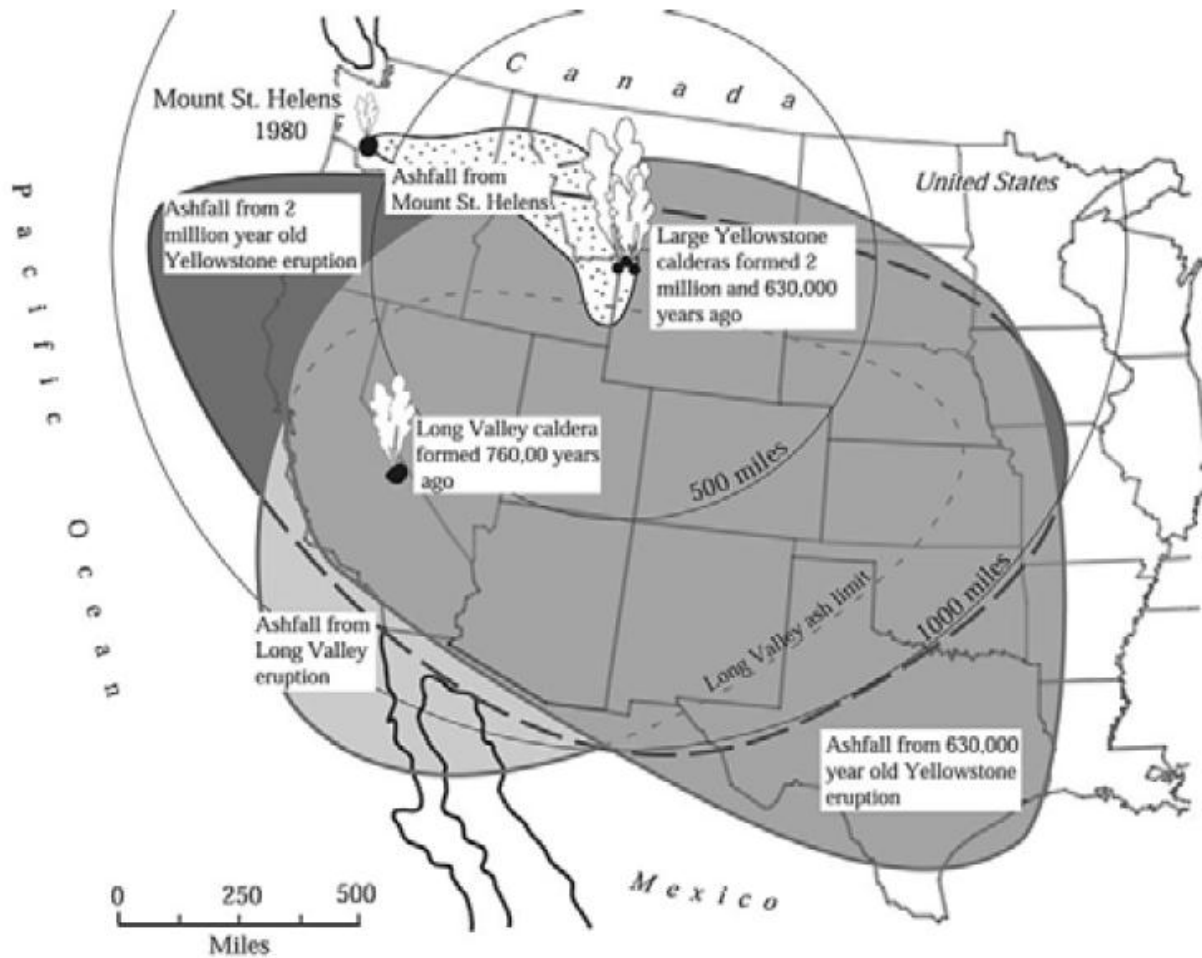


Source: US Geological Survey: Volcanic Ash: Effect & Mitigation Strategies. <http://volcanoes.usgs.gov/ash/properties.html>.

Volcanic ash is formed during explosive volcanic eruptions. Explosive eruptions occur when gases dissolved in molten rock (magma) expand and escape violently into the air, and also when water is heated by magma and abruptly flashes into steam. The force of the escaping gas violently shatters solid rocks. Expanding gas also shreds magma and blasts it into the air, where it solidifies into fragments of volcanic rock and glass. Once in the air, wind can blow the tiny ash particles tens to thousands of miles away from the volcano.

Cataclysmic eruptions 2.0, 1.3, and 0.6 million years ago ejected huge volumes of rhyolite magma; each eruption formed a caldera and extensive layers of thick pyroclastic-flow deposits. The caldera is buried by several extensive rhyolite lava flows that erupted between 75,000 and 150,000 years ago. Fortunately for mankind, an eruption comparable in magnitude with those of Yellowstone has not occurred during recorded history. Figure 3.28 shows distribution of ashfall from Yellowstone's giant eruptions 2 million and 630,000 years ago, compared with ashfall from the 760,000-year-old Long Valley caldera eruptions at Mammoth Lakes, California, and the 1980 eruption of Mount St. Helens, Washington (Adapted from Sarna-Wojcicki, 1991).

Figure 3.28. Areas of the US Once Covered by Volcanic Ash



Source: 2010 Update to the State of Montana Multi-Hazard Mitigation Plan

### Historic Occurrences

Since the late 1700's, volcanic eruptions in the continental United States have occurred in Oregon, Washington, and California. The most recent volcanic activity in the Yellowstone region occurred 70,000 years ago in the form of a lava flow. One incidence of volcanic ash fallout has occurred in the County in recent times. That incident occurred with the eruption of Mount St. Helens in 1980. The Carbon County News reported on May 22, 1980, that the sky appeared to be foggy and a thin layer of gritty, dull, grey powder was deposited.

### Likelihood of Future Occurrence

The primary hazard to which the State may be vulnerable at some future time, is ashfall from a Cascade volcano. Eruptions in the Cascades have occurred at an average rate of 1-2 per century during the last 4,000 years, and future eruptions are certain. Seven volcanoes in the Cascades have erupted in the last 200 years. The next eruption in the



Cascades could affect hundreds of thousands of people. The effect in Montana would depend on the interaction of such variables as source location, frequency, magnitude and duration of eruptions, the nature of the ejected material and the weather conditions. Therefore, the entire state may be considered vulnerable to ashfall to some degree in the event of a volcanic eruption.

Three major periods of activity in the Yellowstone system have occurred at intervals of approximately 600,000 years, and the most recent was about 600,000 years ago. The evidence available is not sufficient to confirm that calderas such as the one in Yellowstone erupt at regular intervals, so the amount of time elapsed is not necessarily a valid indicator of imminent activity. There is no doubt, however, that a large body of molten magma exists, probably less than a mile beneath the surface of Yellowstone National Park. The presence of this body has been detected by scientists who discovered that earthquake waves passing beneath the park behave as if passing through a liquid. The only liquid at that location that could absorb those waves is molten rock. The extremely high temperatures of some of the hot springs in the park further suggest the existence of molten rock at shallow depth. A small upward movement in the magma could easily cause this magma to erupt at the surface. If a major eruption occurred, the explosion would be "comparable to what we might expect if a major nuclear arsenal were to explode all at once, in one place" (Roadside Geology of Montana, Alt and Hyndman, 1986).

### Vulnerability

The Yellowstone Volcano Observatory was created in 2001 by the U.S. Geological Survey to strengthen scientists' ability to track activity that could result in hazardous seismic, hydrothermal, or volcanic events in the region. Benchmarks from 1923 are being re-surveyed and ground movements are being tracked using new satellite-based methods. According to the U.S.G.S. future consequences of volcanic activity in the Park could include destructive earthquakes, hydrothermal explosions, and volcanic eruptions. By monitoring geologic activity, scientists hope to forecast when hot pressurized fluids or molten rock moving beneath Yellowstone will erupt at the surface, but scientists are unable at this time to predict the likelihood of this event from happening. All areas of the County would be affected by a volcanic eruption of the Yellowstone caldera. If a large volcanic eruption were to occur, structures would almost certainly be damaged along with potentially significant loss of life.

### **Wildland Fires**

Chapter V of this plan contains an extensive discussion on wildland fire history and vulnerability of Carbon County to the wildland fire hazard.

## Local Government Critical Facilities and Building Inventory

The following maps show the locations of critical assets for each local government in Carbon County as well as unincorporated areas of the County. Insured values for the municipal and county-owned assets are provided in Appendix C.



## Critical State Facilities

**Table 3.14. State of Montana Assets in Carbon County**

Name	Square Feet
DOT-Bridger Shop	4136
DOT-Red Lodge Shop buildings (4)	36, 480 2400, 3520

## Critical Federal Facilities

**Table 3.15. Federal and Federal Occupied Facilities in Carbon County**

Facility Name	SF
Bear Creek Post Office	480
Belfry Post Office	2125
Bridger Post Office	2342
Edgar Post Office	520
Fromberg Post Office	1220
Joliet Post Office	3447
Red Lodge Post Office	9432
Red Lodge Forest Service Office	6704
Red Lodge Forest Service Warehouse	2974
Roberts Post Office	3153
Roscoe Post Office	915
USDA Service Center-FSA, NRCS, CD	4400
USDA Service Center-RC&D	1500
USDA Plant Materials Center	Multiple buildings, acres

## Values at Risk

The following data is from the Carbon County Assessor's Office. This data should only be used as a guideline to overall values in the County, as the information has some limitations. Carbon County categorizes their parcels by land use using 16 property type categories. The categories are represented in Table 3.16 which shows the count and improved value of parcels that are sorted by property type. It is important to note, in the event of a disaster, it is generally the value of the infrastructure or improvements to the land that is of concern or at risk. Generally, the land itself is not a loss, which is why land value is excluded from this table.

**Table 3.16. Total Property Values in Carbon County**

Property Type	Property Count	Improved Value	Content Value	Total Value
Agricultural rural	3,959	\$53,478,788	\$26,739,394	\$80,218,182
Agricultural urban	6	\$18,082	\$9,041	\$27,123
Commercial rural	69	\$23,852,886	\$23,852,886	\$47,705,772
Commercial urban	342	\$88,898,044	\$88,898,044	\$177,796,088
Exempt property	1,690	\$82,477,962	\$82,477,962	\$164,955,924
Farmstead rural	877	\$166,846,974	\$83,423,487	\$250,270,461
Farmstead urban	1	\$106,724	\$53,362	\$160,086
Industrial rural	8	\$17,428,408	\$26,142,612	\$43,571,020
Industrial urban	1	\$1,318	\$1,977	\$3,295
Mining claim	5	\$12,707	\$19,061	\$31,768
Non-valued property	33	\$11,074,397	\$0	\$11,074,397
Residential rural	2,122	\$605,661,678	\$302,830,839	\$908,492,517
Residential urban	2,158	\$335,807,385	\$167,903,693	\$503,711,078
Vacant land rural	1,988	\$121,485,077	\$0	\$121,485,077
Vacant land urban	831	\$60,910,304	\$0	\$60,910,304
Other	18	\$4,363,571	\$2,181,786	\$6,545,357
<b>Total</b>	<b>14,108</b>	<b>\$1,572,424,305</b>	<b>\$804,534,143</b>	<b>\$2,376,958,448</b>

Source: Carbon County Assessor's Office, 2011

**Note:** Per Hazus 2.0 TechManual specs Section 14.2.2: Industrial Content values are calculated at 150% of the improved value; agricultural and commercial content values are calculated at 100% of the improved value; other and residential content values are calculated at 50% of the improved values; vacant land content values are calculated at 0% of the improved values

## Vulnerable Populations

The following facilities are considered critical assets and may have vulnerable populations associated with them.

**Table 3.17. Schools in Carbon County**

Name	2010 Enrollment	Square feet	Construction Date
Belfry Elem. and H.S, K-12	51		1963, 1930's
Bridger Elementary	115	23,572	1968
Bridger 7-8, H.S.	82	24,140	1956
Fromberg K + Elementary	63	7,756	1955
Fromberg 7-8, H.S.	67	9,350	1930
Joliet Public School K-12	371	75,322	1908
Luther Elem. (2 bldgs) K-8	36	3,314	1920
Red Lodge Mtn View Elementary	128	17,100	1950
Red Lodge Roosevelt Junior High	111	13,650	1920 1989 addition
Red Lodge H.S.	170	27,890	2011
Roberts K-12	141	29,000	1920/1990/2002

Source: Office of Public Instruction website

**Table 3.18. Health Care Facilities**

Name	Location	Licensed beds	Square Feet	Const. Date
Beartooth Hospital and Health Center	U.S. Hwy 212	25	48,000	2010
Beartooth Industries GroupHome	223 East Cooper St. Red Lodge	8	4,200	1980
Beartooth Industries GroupHome	1002 White St. Red Lodge	8	4,200	1980
Cedar Wood Villa Nursing Home	1 S. Oakes Red Lodge	43	22,000	1973
St. John's Assisted Living Facility	U.S. Highway 212	20	10,000	2012

Sources: Facility Managers

The 2010 US Census data shows vulnerable populations in Carbon County. These are shown in Table 3.19. Vulnerable populations are addressed in the Carbon County EOP.

**Table 3.19. Vulnerable Populations in Carbon County**

Census Designation	Percent of Population
Population under 5 years of age	4.1%
Population under 18 years of age	19.7%
Population 65 or older	18.8%

Source: US Census Bureau, 2010

## **Potential Loss Estimates**

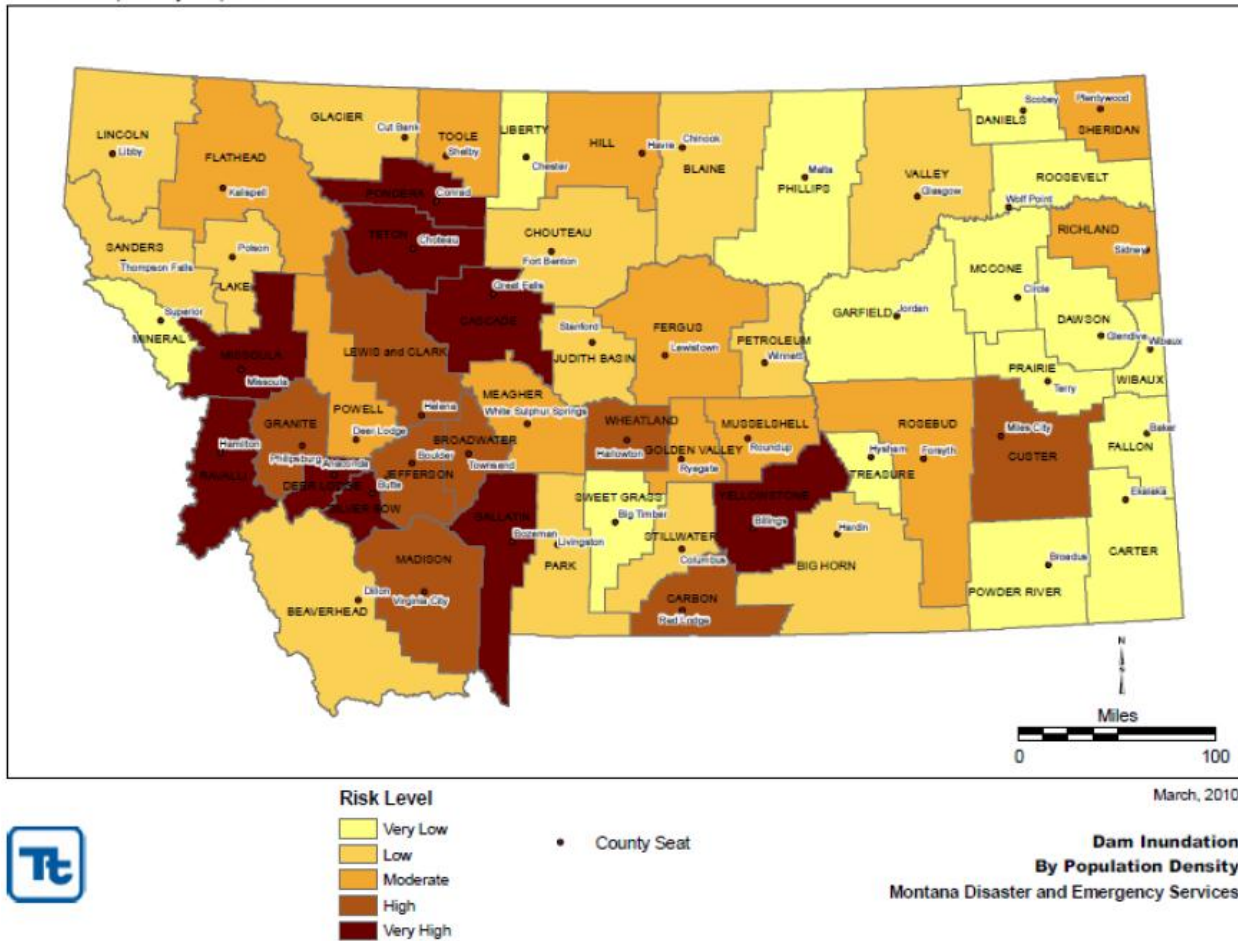
### **Methodology**

The methodology for developing loss estimates varies by hazard. In some cases, historical examples are available. In other cases, an event has been postulated. To develop potential loss estimates, specific past disaster events have been used where available. When figures were not available, they have been estimated. Explanations of the methodology and information sources are provided under each hazard.

### **Dam Failure**

Figure 3.29 graphically presents the results of the State of Montana's analysis. The State used GIS and intersected inundation areas of the Montana-regulated high hazard dams intersected with population density to show the relative risk of dam failure by county. Each county was assigned a score of 1 to 10 based on both population and hazard risk. Using GIS, hazard risk was determined by the percent inundation areas within the county in square miles. Only Montana-related high hazard dams were included in the analysis as inundation areas associated with the federally-related dams were not available for analysis. These scores were then added together to demonstrate the areas of population in the state most vulnerable to dam failure floods. Risk levels have been displayed in five categories from very high to very low. Carbon County was given a high risk level.

**Figure 3.29. Risk of Dam Failure by County in Montana**



Source: 2010 Update to the State of Montana Multi-Hazard Mitigation Plan

**Table 3.20. Analysis of Population Density and Dam Inundation Area Building Stock**

County	Population Density + Property Damage Rating	Projected Building Stock Vulnerability in Inundation Areas
Carbon	12-High	\$47,361,568

Source: 2010 Update to the State of Montana Multi-Hazard Mitigation Plan

## Earthquake

Hazus-MH 2.0, FEMA’s loss estimation software, was utilized to model earthquake losses for Carbon County during the 2012 update to this plan. A Level 1 analysis was completed, meaning that only the default data was used and not supplemented with local building inventory or hazard data. There are certain data limitations when using the default data, so the results should be interpreted accordingly; this is a planning level analysis.

The methodology for running the probabilistic earthquake scenario used probabilistic seismic hazard contour maps developed by the U.S. Geological Survey (USGS) for the 2002 update of the National Seismic Hazard Maps that are included with Hazus-MH. The USGS maps provide estimates of potential ground acceleration and spectral acceleration at periods of 0.3 second and 1.0 second, respectively. The 2,500 year return period analyzes ground shaking estimates with a 2 percent probability of being exceeded in 50 years, from the various seismic sources in the area. The International Building Code uses this level of ground shaking for building design in seismic areas and is more of a worst case scenario.

The results of the probabilistic scenario are captured in Table 3.21. Key losses included the following:

- Total economic loss estimated for the earthquake was \$34.14 million, which includes building losses and lifeline losses based on the Hazus-MH inventory.
- Building-related losses, including direct building losses and business interruption losses, totaled \$32.8 million.
- Over 11 percent of the buildings in the County were at least moderately damaged. 16 buildings were completely destroyed.
- Over 61 percent of the building- and income-related losses were residential structures. 27 percent of the estimated losses were related to business interruptions.
- The mid-day earthquake caused the most casualties: 7.

**Table 3.21. Carbon County Hazus-MH 2,500-year Earthquake Scenario**

Impacts/Earthquake	Hazus Loss Estimate
Residential Buildings Damaged (Based upon buildings)	Slight: 1,224 Moderate: 611 Extensive: 148 Complete: 16
Building Related Loss	\$32,800,000
Total Economic Loss	\$34,140,000
Injuries (Based upon 2am time of occurrence)	Without requiring hospitalization: 5 Requiring hospitalization: 1 Life Threatening: 0 Fatalities: 0



Impacts/Earthquake	Hazus Loss Estimate	
Injuries (Based upon 2pm time of occurrence)	Without requiring hospitalization: 7 Requiring hospitalization: 1 Life Threatening: 0 Fatalities: 0	
Injuries (Based upon 5pm time of occurrence)	Without requiring hospitalization: 6 Requiring hospitalization: 1 Life Threatening: 0 Fatalities: 0	
Essential Facility Damage (Based upon 37 buildings)	No facilities with moderate or complete damage.	
Transportation and Utility Lifeline Damage	Multiple leaks and breaks in water, natural gas, and oil lines.	
Households w/out Power & Water Service (Based upon 9,552 households)	Power Loss @ Day 1: 0 Power Loss @ Day 3: 0 Power Loss @ Day 7: 0 Power Loss @ Day 30: 0	Water Loss @ Day 1: 0 Water Loss @ Day 3: 0 Water Loss @ Day 7: 0 Water Loss @ Day 30: 0
Displaced Households	7	
Shelter Requirements	4	
Debris Generation	10,000 tons	

Source: Hazus-MH 2.0

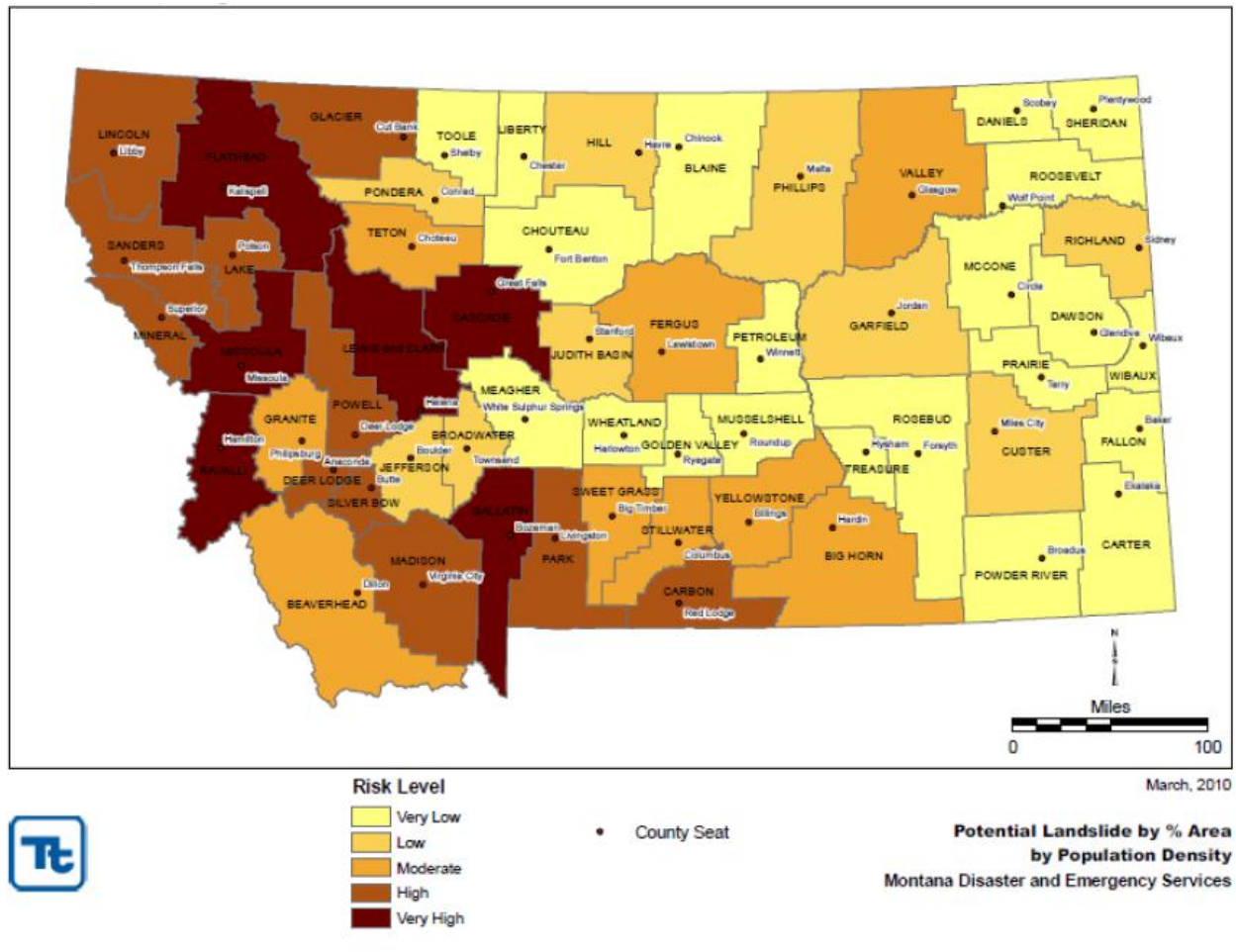
## Earth Movement

Most rock slides that occur in the County are small and localized. Associated costs are generally limited to clean-up which would involve heavy equipment and personnel for short periods of time. The dollar range for dealing with the more common rock slides ranges from several hundred to several thousand dollars.

In the case of the spring 2005 slides on the Beartooth Highway, however, costs were significant. The road repair alone cost approximately \$16 million. Business interruption and loss caused additional damages from this event. Some businesses in Red Lodge received low interest loans from FEMA as a result.

Figure 3.30 from the 2010 Update to the State of Montana Multi-Hazard Mitigation Plan graphically presents landslide risk intersected with population density to show Montana counties as population base-plus-risk hazard areas. A GIS layer was compiled of historic landslide occurrences and slopes over 55 percent, as described previously. This data was intersected with population density based on percentage of the hazard in each census tract. Each county was assigned a score of 1 to 10 based on population and hazard risk. These scores were then added together to demonstrate the areas of population in the state most vulnerable to landslides. Risk levels have been displayed in five categories from very high to very low. Table 3.22 displays the counties with very high and high ratings with projected building stock vulnerability from the risk assessment, with Carbon County receiving a 'High' risk designation.

**Figure 3.30. Landslide Risk by County in the State of Montana**



Source: 2010 Update to the State of Montana Multi-Hazard Mitigation Plan

**Table 3.22. Analysis of Population Density and Landslide Risk With Building Stock**

County	Population Density + Property Damage (Rating)	Building Stock Vulnerability in Hazard Area
Carbon	12 - High	\$38,832,480

Source: 2010 Update to the State of Montana Multi-Hazard Mitigation Plan

## Flood

Historically, Carbon County has been at risk to flooding primarily during the winter and spring months when river systems in the County swell with heavy rainfall. Normally, storm floodwaters are kept within defined limits by a variety of storm drainage and flood control measures. But, occasionally, extended heavy rains result in floodwaters that exceed normal high-water boundaries and cause damage.

Flooding has occurred in the past: within the 100-year floodplain and in other localized areas. In addition to damage to area infrastructure, other problems associated with

flooding include erosion, sedimentation, degradation of water quality, loss of environmental resources, and certain health hazards.

## **Methodology**

Carbon County's parcel layer was used as the basis for the inventory of developed parcels in the County and each jurisdiction. GIS was used to create a centroid or point, representing the center of each parcel polygon, which was overlaid on the floodplain layer. For the purposes of this analysis, the flood zone that intersected the centroid was assigned as the flood zone for the entire parcel. The parcels were segregated and analyzed for the entire County and each jurisdiction. Following this methodology, flood maps were created that illustrate where flooding is most likely to happen in:

- Town of Bearcreek (see Figure 3.31)
- Town of Bridger (see Figure 3.32)
- Town of Fromberg (see Figure 3.33)
- Town of Joliet (see Figure 3.34)
- City of Red Lodge (see Figure 3.35)
- Unincorporated Carbon County (see Figure 3.17)

The results are summarized in the discussion that follows the figures.

Figure 3.31. Town of Bear Creek Preliminary DFIRM and Critical Facilities

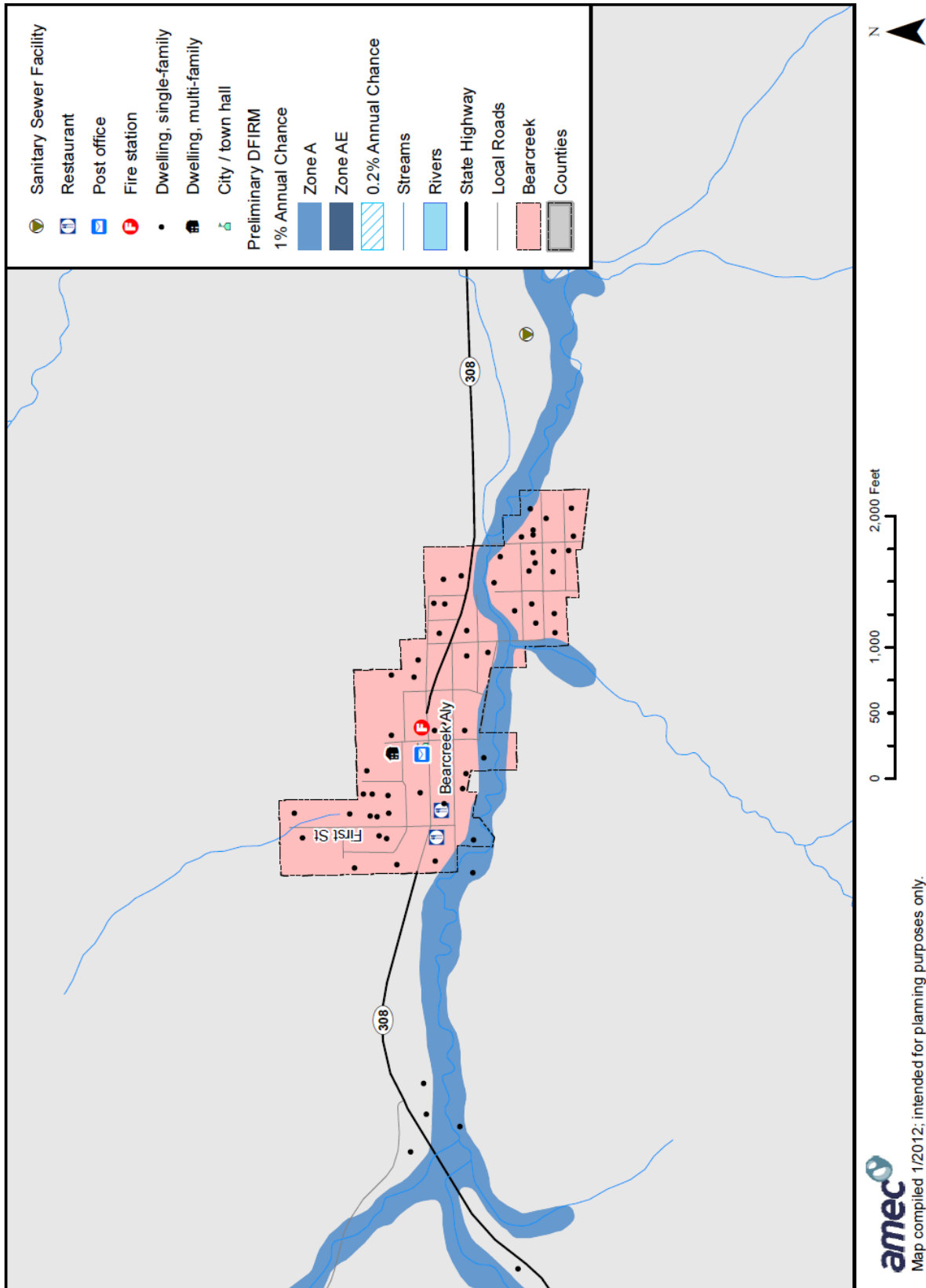


Figure 3.32. Town of Bridger Preliminary DFIRM and Critical Facilities

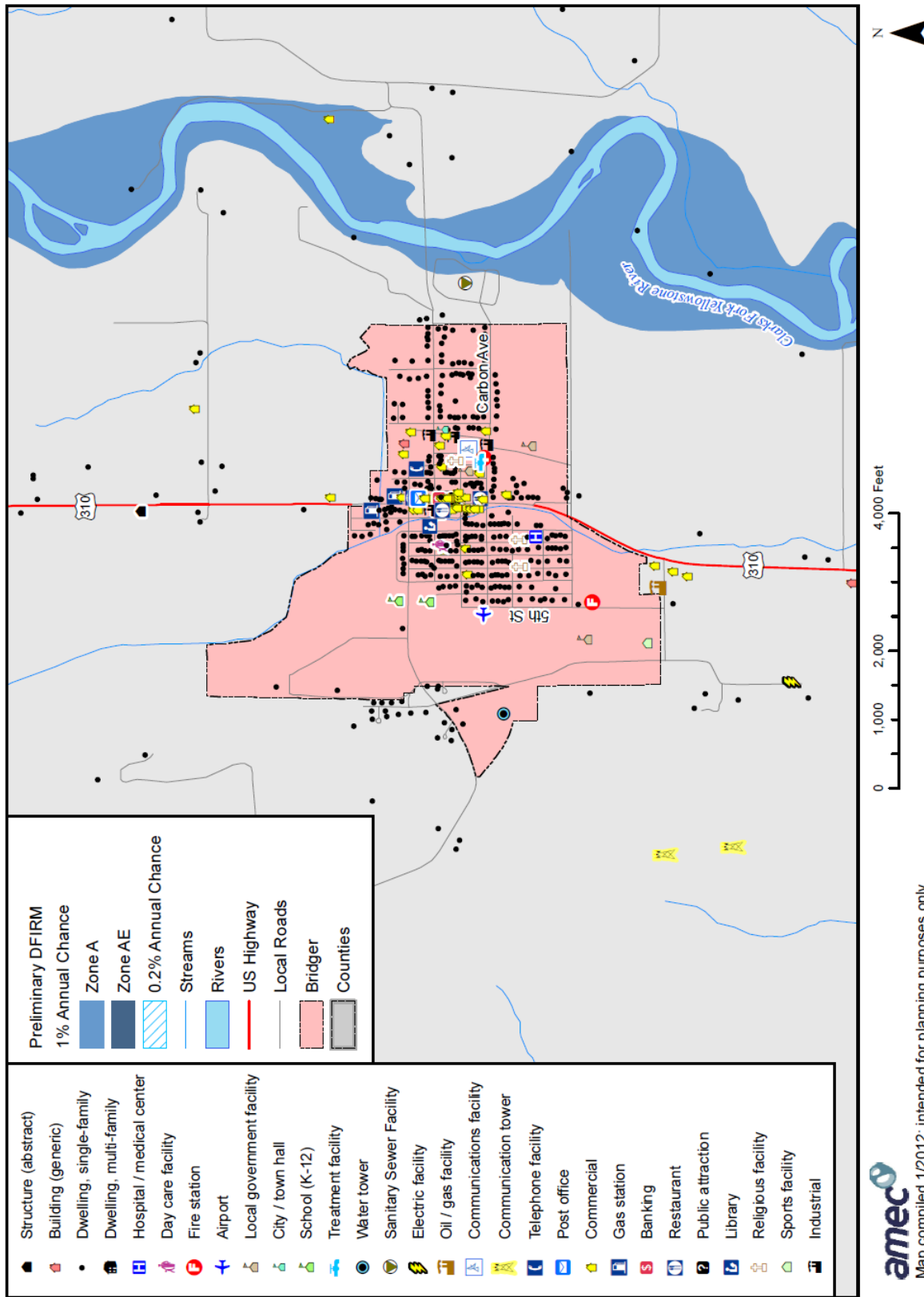
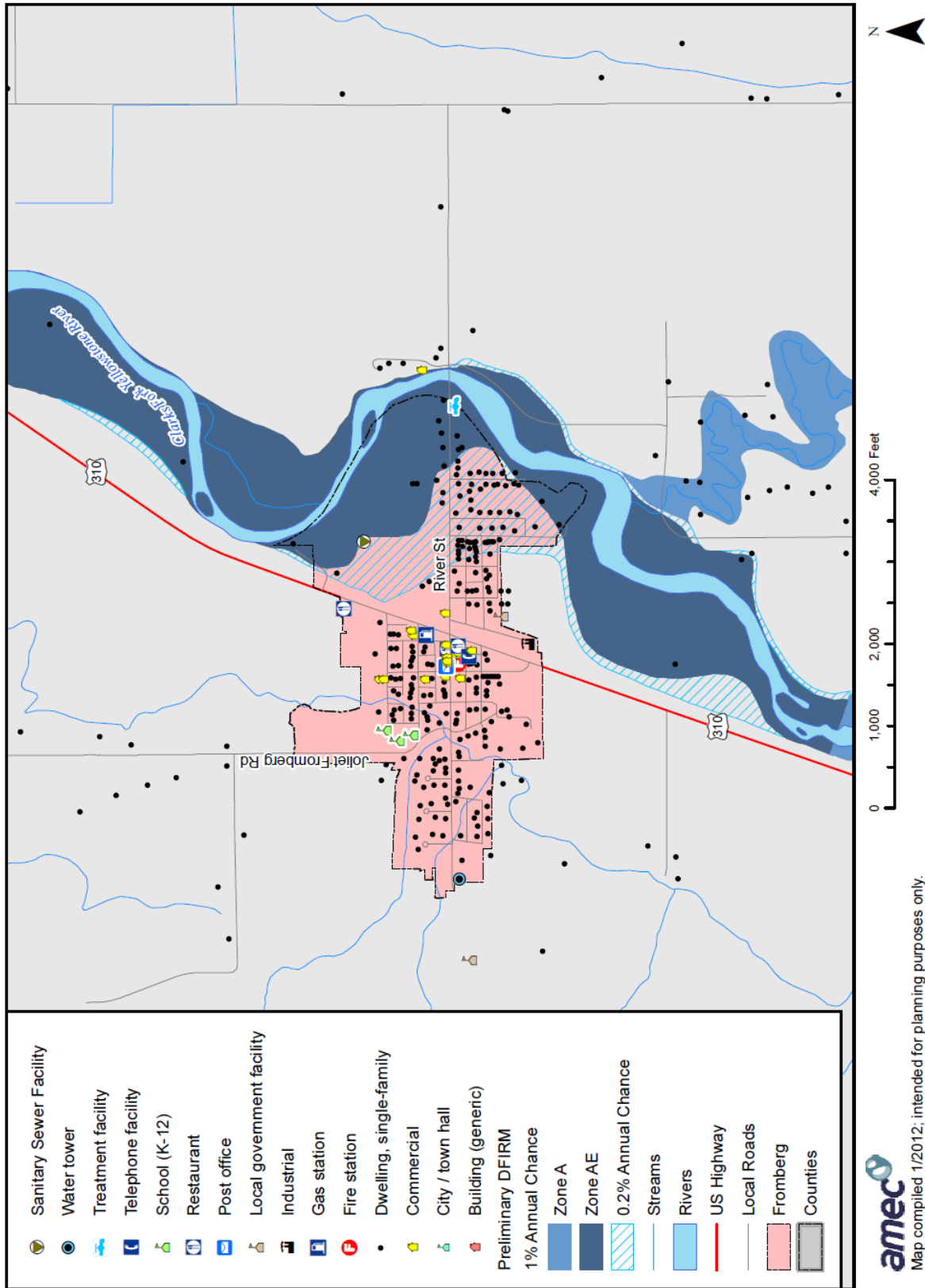


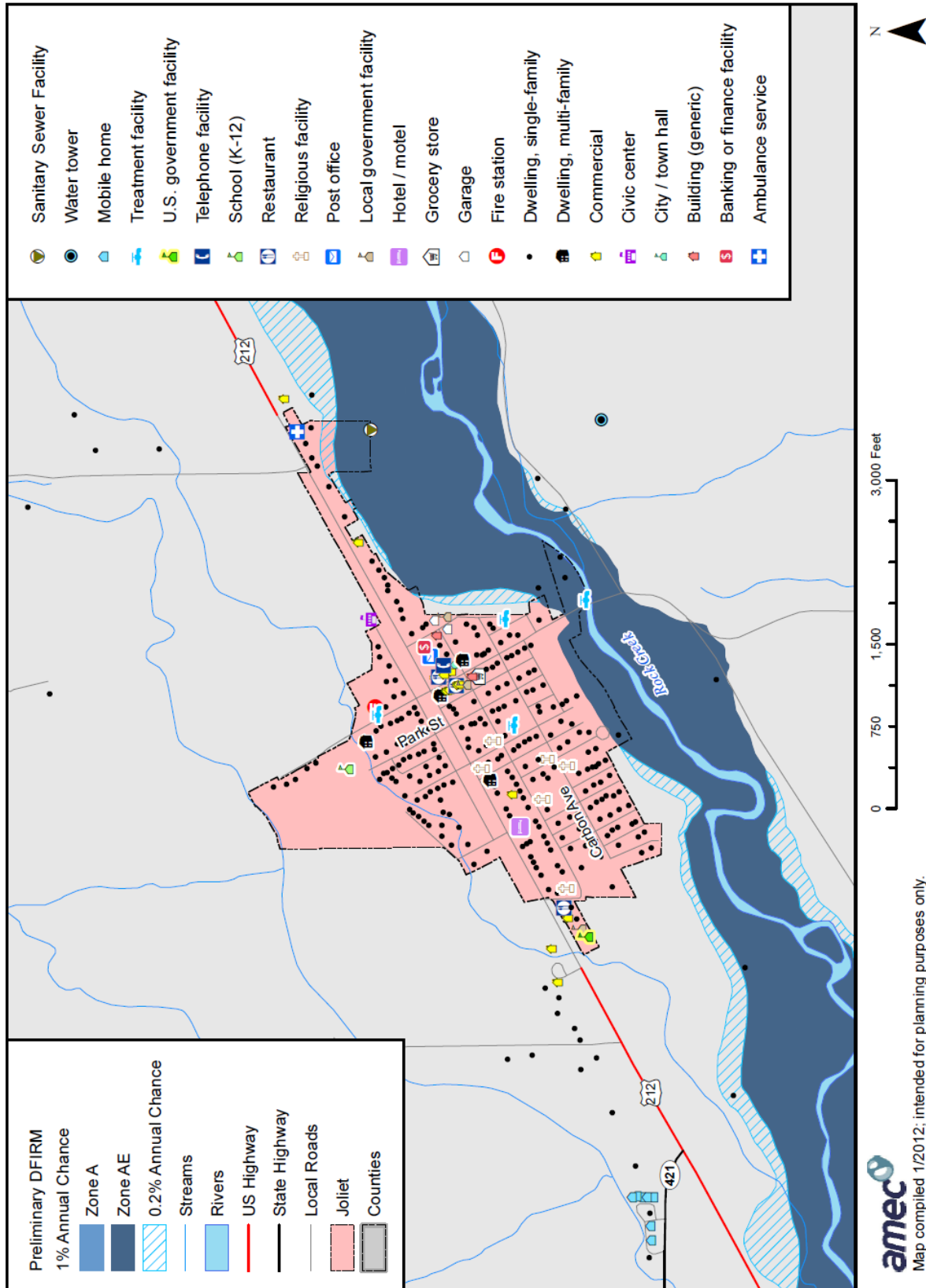
Figure 3.33. Town of Fromberg Preliminary DFIRM and Critical Facilities



Map compiled 1/2012; intended for planning purposes only.  
 Data Source: Carbon County, FEMA Preliminary DFIRM July 29, 2011

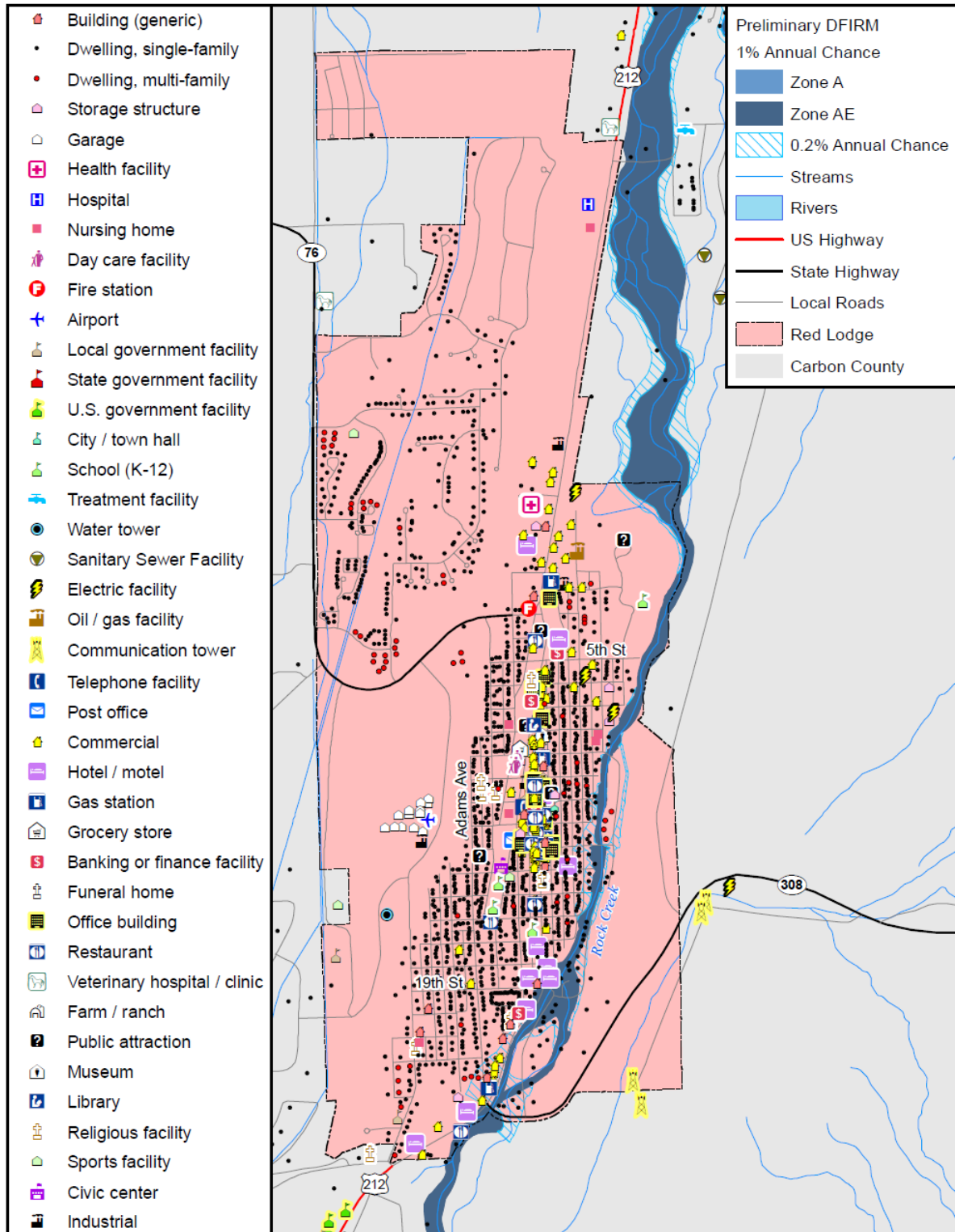


Figure 3.34. Town of Joliet Preliminary DFIRM and Critical Facilities





**Figure 3.35. City of Red Lodge Preliminary DFIRM and Critical Facilities**



Map compiled 1/2012; intended for planning purposes only.  
 Data Source: Carbon County, FEMA Preliminary DFIRM July 29, 2011

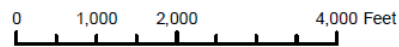


Table 3.23 shows the count, improved value, and contents value of parcels that fall in a floodplain, by 1% annual chance flood, 0.2% annual chance flood, and total flood (1% and 0.2% annual chance floods combined). Figure 3.36 shows potential loss from flooding by census tract in the County. The potential loss at 20% column assumes a 2 foot deep flood, which would cause damage to 20% of the total value of the structure.

**Table 3.23. County and Jurisdiction Count and Improved Value of Parcels in the Floodplain**

DFIRM Zones	Property Type	Property Count	Improved Value	Content Value	Total Value	Potential Loss at 20%
<b>Town of Bearcreek</b>						
Zone A	Exempt property	1	\$23,550	\$23,550	\$47,100	\$9,420
	Farmstead rural	1	\$142,775	\$71,388	\$214,163	\$42,833
	Residential urban	2	\$320,028	\$160,014	\$480,042	\$96,008
	Vacant land urban	6	\$134,502	\$0	\$134,502	\$26,900
<b>Total Bearcreek Flood</b>		<b>10</b>	<b>\$620,855</b>	<b>\$254,952</b>	<b>\$875,807</b>	<b>\$175,161</b>
<b>Town of Fromberg</b>						
Zone AE	Agricultural rural	1	\$286	\$286	\$572	\$114
	Exempt property	2	\$215,705	\$215,705	\$431,410	\$86,282
	Farmstead rural	1	\$43,756	\$43,756	\$87,512	\$17,502
	Residential urban	9	\$1,375,525	\$687,763	\$2,063,288	\$412,658
<b>Total 1% Annual Chance</b>		<b>13</b>	<b>\$1,635,272</b>	<b>\$947,510</b>	<b>\$2,582,782</b>	<b>\$516,556</b>
0.2% Annual	Commercial urban	1	\$31,724	\$31,724	\$63,448	\$12,690
	Exempt property	3	\$91,530	\$91,530	\$183,060	\$36,612
	Residential urban	35	\$2,516,748	\$1,258,374	\$3,775,122	\$755,024
	Vacant land urban	5	\$108,672	\$0	\$108,672	\$21,734
<b>Total 0.2% Annual Chance</b>		<b>44</b>	<b>\$2,748,674</b>	<b>\$1,381,628</b>	<b>\$4,130,302</b>	<b>\$826,060</b>
<b>Total Fromberg Flood</b>		<b>57</b>	<b>\$4,383,946</b>	<b>\$2,329,138</b>	<b>\$6,713,084</b>	<b>\$1,342,617</b>

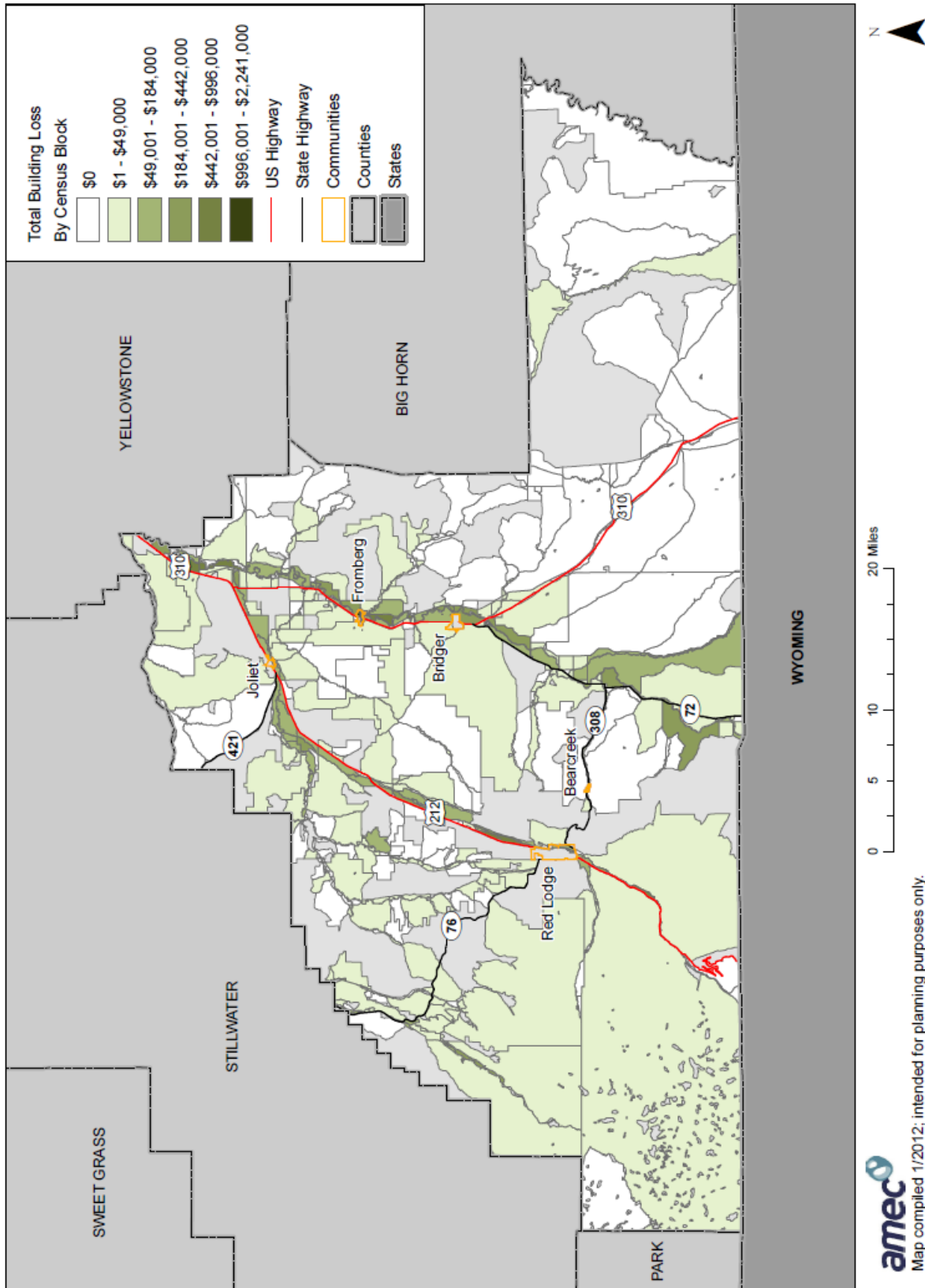
DFIRM Zones	Property Type	Property Count	Improved Value	Content Value	Total Value	Potential Loss at 20%
<b>Town of Joliet</b>						
Zone AE	Exempt property	1	\$39,631	\$39,631	\$79,262	\$15,852
	Residential urban	2	\$396,500	\$198,250	\$594,750	\$118,950
	Vacant land urban	2	\$60,546	\$0	\$60,546	\$12,109
<b>Total 1% Annual Chance</b>		<b>5</b>	<b>\$496,677</b>	<b>\$237,881</b>	<b>\$734,558</b>	<b>\$146,912</b>
0.2% Annual	Residential urban	1	\$155,700	\$77,850	\$233,550	\$46,710
	Vacant land urban	1	\$52,617	\$0	\$52,617	\$10,523
<b>Total 0.2% Annual Chance</b>		<b>2</b>	<b>\$208,317</b>	<b>\$77,850</b>	<b>\$286,167</b>	<b>\$57,233</b>
<b>Total Joliet Flood</b>		<b>7</b>	<b>\$704,994</b>	<b>\$315,731</b>	<b>\$1,020,725</b>	<b>\$204,145</b>
<b>City of Red Lodge</b>						
Zone AE	Commercial urban	5	\$1,545,432	\$1,545,432	\$3,090,864	\$618,173
	Exempt property	4	\$222,310	\$222,310	\$444,620	\$88,924
	Residential urban	21	\$5,696,425	\$2,848,213	\$8,544,638	\$1,708,928
	Vacant land urban	4	\$835,358	\$0	\$835,358	\$167,072
<b>Total 1% Annual Chance</b>		<b>34</b>	<b>\$8,299,525</b>	<b>\$4,615,955</b>	<b>\$12,915,480</b>	<b>\$2,583,096</b>
0.2% Annual	Commercial urban	5	\$1,422,715	\$1,422,715	\$2,845,430	\$569,086
	Residential urban	34	\$8,999,287	\$4,499,644	\$13,498,931	\$2,699,786
	Vacant land urban	14	\$2,251,684	\$0	\$2,251,684	\$450,337
<b>Total 0.2% Annual Chance</b>		<b>53</b>	<b>\$12,673,686</b>	<b>\$5,922,359</b>	<b>\$18,596,045</b>	<b>\$3,719,209</b>
<b>Total Red Lodge Flood</b>		<b>87</b>	<b>\$20,973,211</b>	<b>\$10,538,313</b>	<b>\$31,511,524</b>	<b>\$6,302,305</b>

DFIRM Zones	Property Type	Property Count	Improved Value	Content Value	Total Value	Potential Loss at 20%
<b>Carbon County</b>						
Zone A	Agricultural rural	113	\$1,353,256	\$1,353,256	\$2,706,512	\$541,302
	Commercial rural	5	\$1,252,548	\$1,252,548	\$2,505,096	\$501,019
	Commercial urban	1	\$224,855	\$224,855	\$449,710	\$89,942
	Exempt property	27	\$464,808	\$464,808	\$929,616	\$185,923
	Farmstead rural	65	\$17,304,989	\$17,304,989	\$34,609,978	\$6,921,996
	Residential rural	103	\$29,837,252	\$29,837,252	\$59,674,504	\$11,934,901
	Residential urban	7	\$664,477	\$332,239	\$996,716	\$199,343
	Vacant land rural	66	\$2,455,098	\$0	\$2,455,098	\$491,020
	Vacant land urban	5	\$95,522	\$0	\$95,522	\$19,104
Zone AE	Agricultural rural	45	\$283,899	\$283,899	\$567,798	\$113,560
	Commercial rural	2	\$903,391	\$903,391	\$1,806,782	\$361,356
	Exempt property	9	\$235,963	\$235,963	\$471,926	\$94,385
	Farmstead rural	17	\$2,943,832	\$2,943,832	\$5,887,664	\$1,177,533
	Residential rural	128	\$35,951,148	\$35,951,148	\$71,902,296	\$14,380,459
	Residential urban	3	\$252,389	\$126,195	\$378,584	\$75,717
	Vacant land rural	88	\$9,290,765	\$0	\$9,290,765	\$1,858,153
<b>Total 1% Annual Chance</b>		<b>684</b>	<b>\$103,514,192</b>	<b>\$91,214,375</b>	<b>\$194,728,567</b>	<b>\$38,945,713</b>
0.2% Annual	Agricultural rural	3	\$11,674	\$11,674	\$23,348	\$4,670
	Commercial rural	2	\$204,488	\$204,488	\$408,976	\$81,795
	Farmstead rural	6	\$733,449	\$733,449	\$1,466,898	\$293,380
	Residential rural	18	\$4,723,495	\$4,723,495	\$9,446,990	\$1,889,398
	Vacant land rural	10	\$1,112,083	\$0	\$1,112,083	\$222,417
<b>Total 0.2% Annual Chance</b>		<b>39</b>	<b>\$6,785,189</b>	<b>\$5,673,106</b>	<b>\$12,458,295</b>	<b>\$2,491,659</b>
<b>Total Carbon County Flood</b>		<b>723</b>	<b>\$110,299,381</b>	<b>\$96,887,480</b>	<b>\$207,186,861</b>	<b>\$41,437,372</b>

Source: FEMA Preliminary DFIRM, Carbon County Assessor's Office

**Note:** Per Hazus 2.0 TechManual specs Section 14.2.2: Industrial Content values are calculated at 150% of the improved value; agricultural and commercial content values are calculated at 100% of the improved value; other and residential content values are calculated at 50% of the improved values; vacant land content values are calculated at 0% of the improved values

Figure 3.36. Carbon County Building Loss



**amec**  
 Map compiled 1/2012; intended for planning purposes only.  
 Data Source: Carbon County, Hazus-MH 2.0

## Structures/Critical Facilities at Risk

A separate analysis was performed on the structures and critical facility inventory in Carbon County and all jurisdictions. GIS was used to determine whether the structure or facility locations intersects a preliminary DFIRM flood hazard areas, and if so, which zone it intersects. There are 539 structures and facilities in the 1% and 0.2% annual chance floodplains, as shown in Table 3.24.

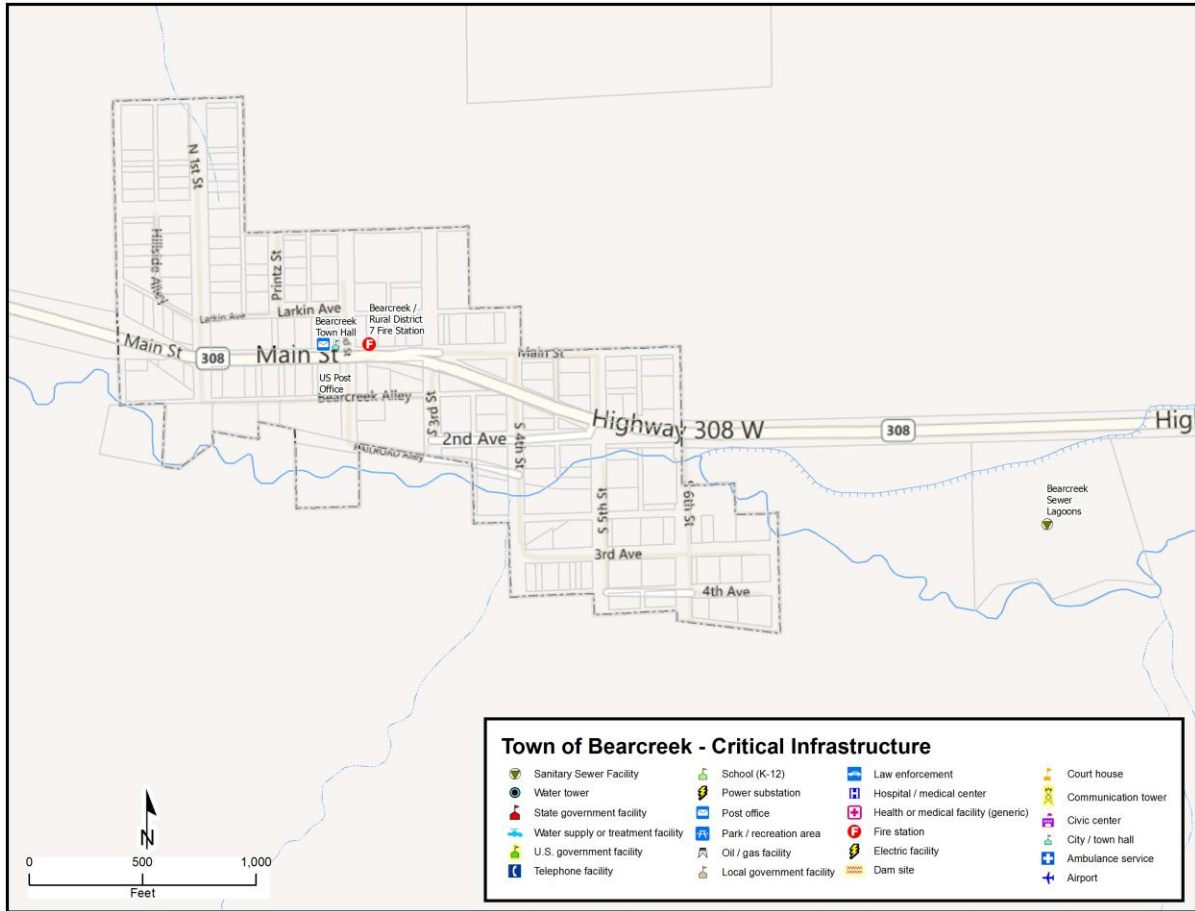
**Table 3.24. Structures and Critical Facilities in the Floodplain**

Jurisdiction	DFIRM Zones	Structure Type	Structure Count
Bearcreek	Zone A	Dwelling, single-family	3
Fromberg	Zone AE	Dwelling, single-family	13
		Water Treatment facility	1
	0.2% Annual	Dwelling, single-family	58
		Sanitary Sewer Facility	1
Joliet	Zone AE	Dwelling, single-family	3
		Water Treatment facility	1
Red Lodge	Zone AE	Building	1
		Dwelling, single-family	20
		Hotel / motel	2
	0.2% Annual	Building	1
		Commercial	5
		Dwelling, multi-family	1
		Dwelling, single-family	34
Gas station	1		

Jurisdiction	DFIRM Zones	Structure Type	Structure Count
Carbon County	Zone A	Cabin / guest house	2
		Commercial	5
		Dam site	1
		Dwelling, single-family	190
		Farm / ranch	1
		Hotel / motel	1
		Industrial	1
		Mobile home	1
		Other	1
		Restaurant	1
		Sanitary Sewer Facility	2
		State government facility	1
		Storage structure	1
		Structure	1
	Telephone facility	1	
	Zone AE	Commercial	1
		Dwelling, single-family	149
		Garage	1
		Mobile home	1
		Public attraction	1
Sanitary Sewer Facility		1	
0.2% Annual Chance	Dwelling, single-family	30	
<b>Total Flood</b>		<b>394</b>	

Source: FEMA, Carbon County Assessor's Office

Figure 3.37. Bearcreek Critical Infrastructure





**Figure 3.38 Bridger Critical Infrastructure**

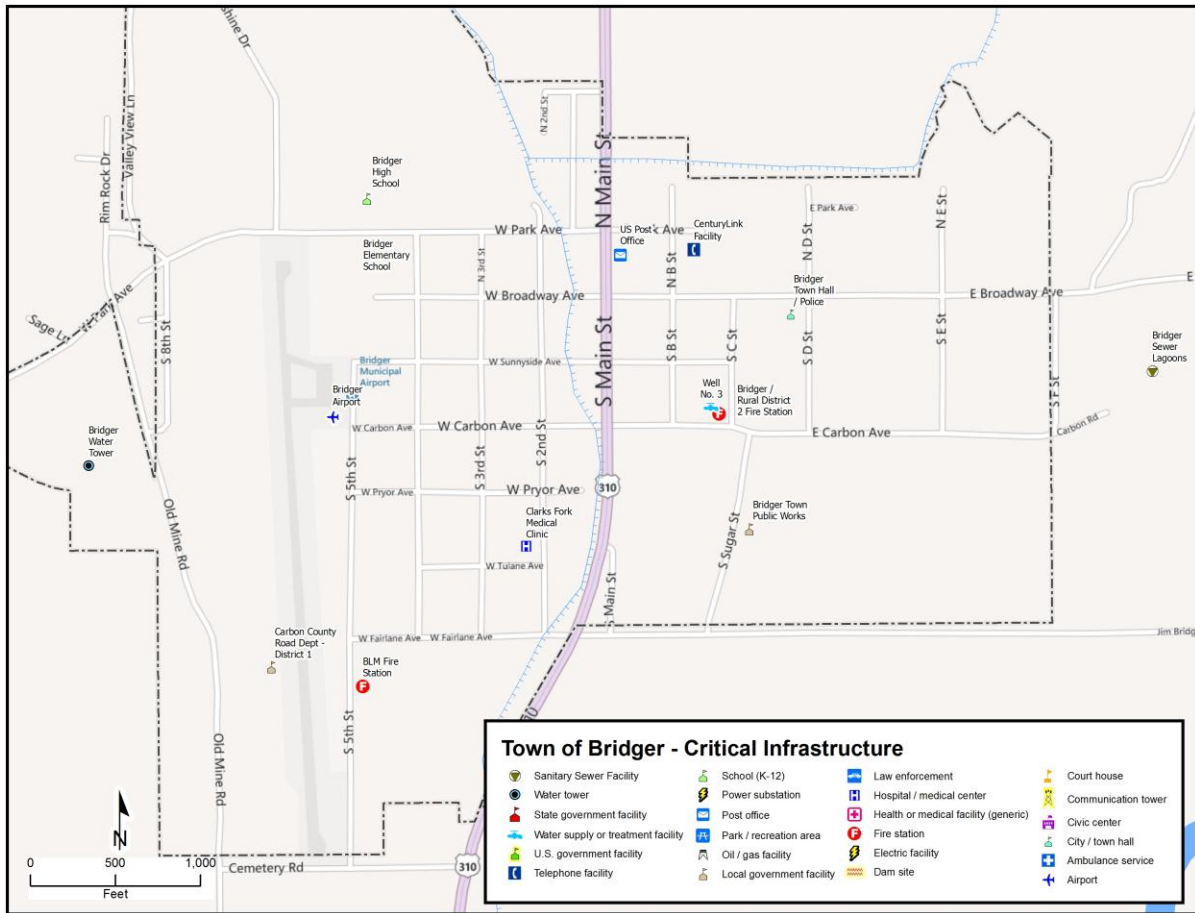
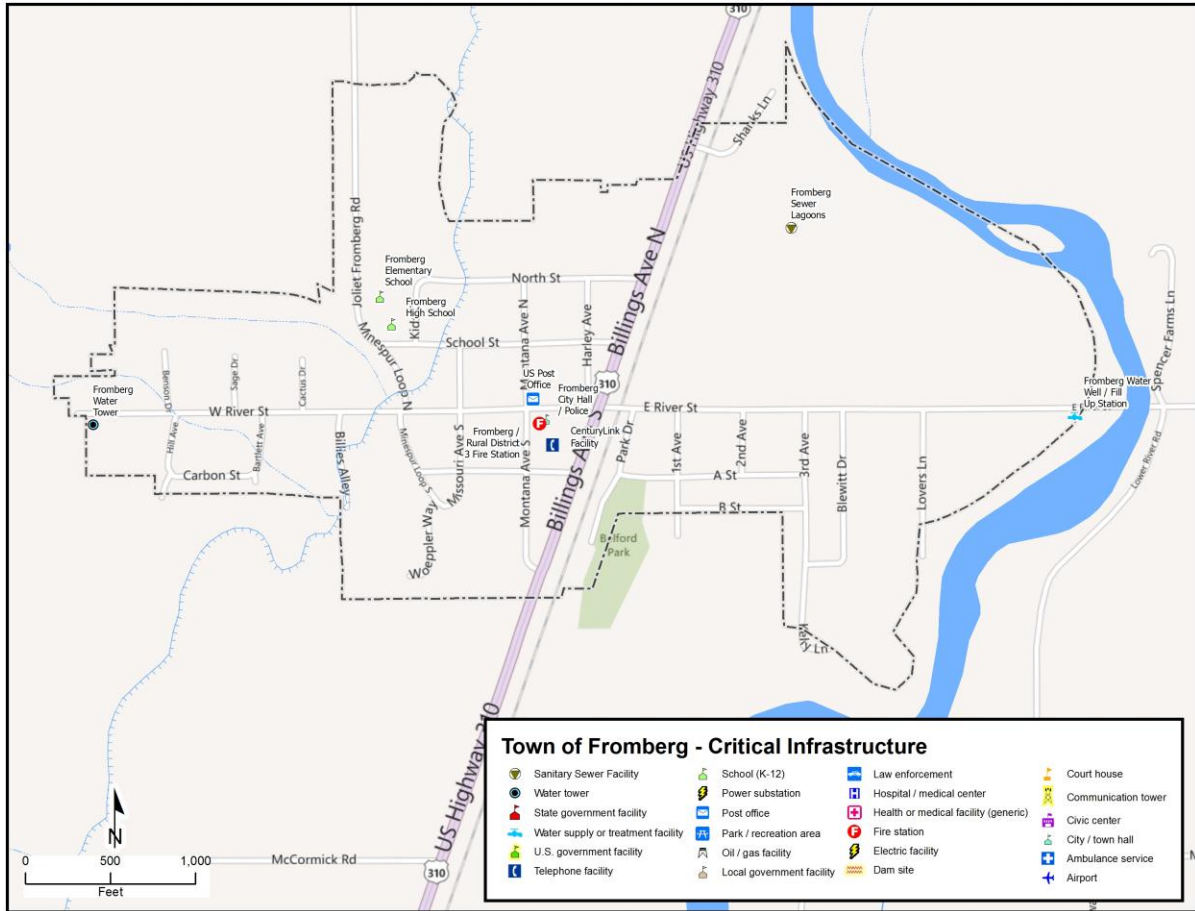


Figure 3.39 Fromberg Critical Infrastructure



**Figure 3.40 Joliet Critical Infrastructure**

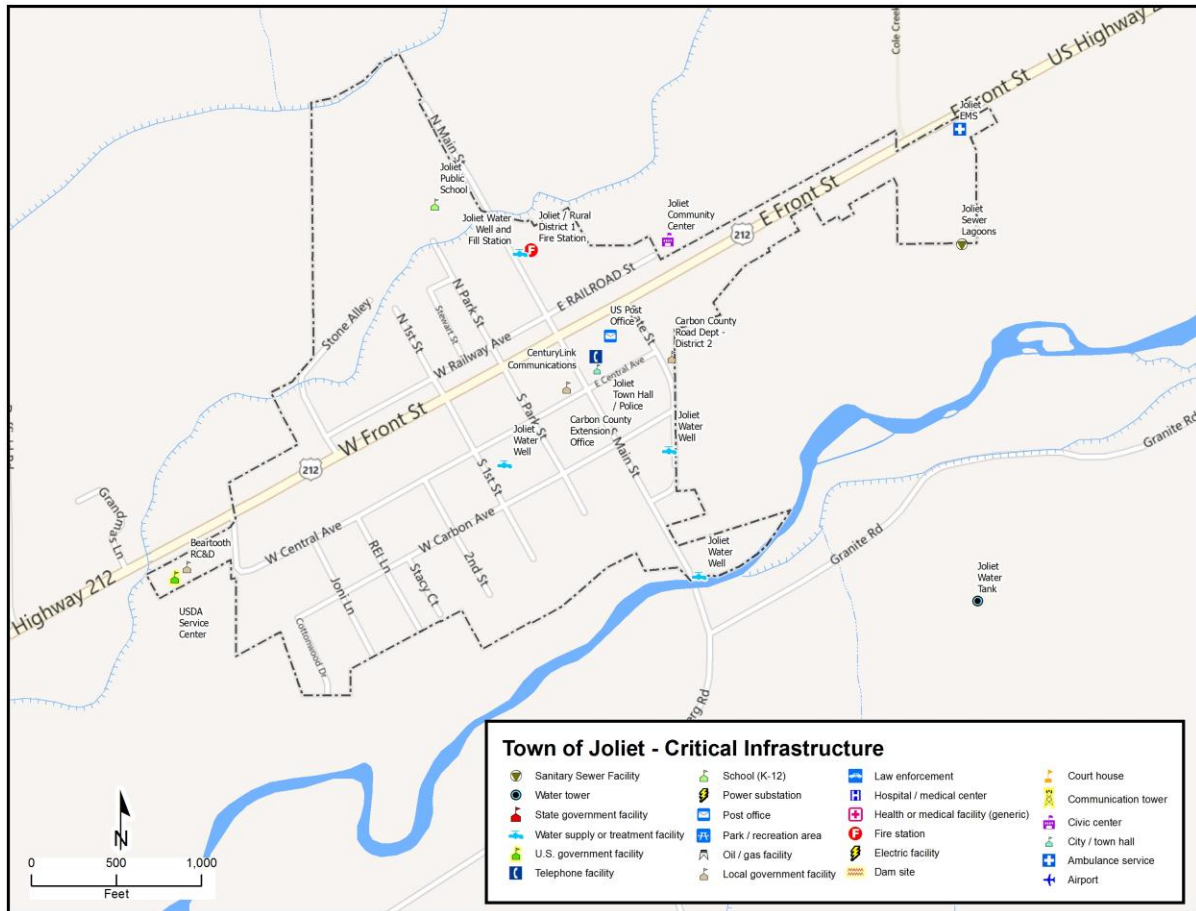
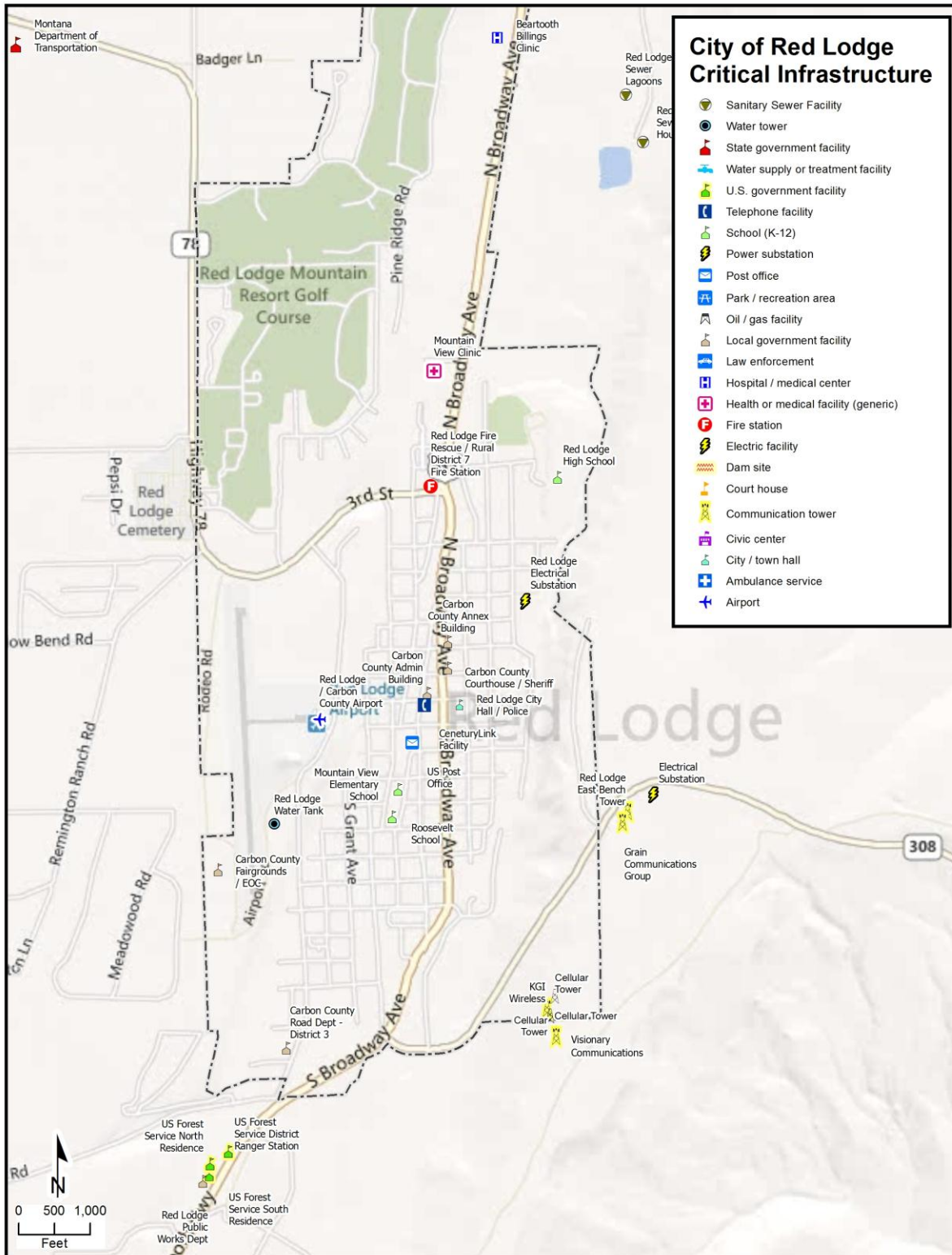


Figure 3.41 Red Lodge Critical Infrastructure



## Population at Risk

A separate analysis was performed to determine population in flood zones. Using GIS, the DFIRM Flood dataset was overlaid on the improved residential parcel data. Those residential parcel centroids that intersected a flood zone were counted and multiplied by the 2010 Census average household size for Carbon County (2.19 persons/household); results were tabulated by jurisdiction and flood zone (see Table 3.2525). According to this analysis, there is a population of 786 in the 1% annual chance flood event, and 206 in the 0.2% annual chance flood event.

**Table 3.25. Improved Residential Parcels and Population in the Floodplain**

<b>Bearcreek</b>		
DFIRM Zones	Structure Type	Structure Count
Zone A	Dwelling, single-family	3
<b>Total 1% Annual Chance</b>		<b>3</b>
<b>Fromberg</b>		
DFIRM Zones	Structure Type	Structure Count
Zone AE	Dwelling, single-family	13
	Water Treatment facility	1
<b>Total 1% Annual Chance</b>		<b>14</b>
0.2% Annual	Dwelling, single-family	58
	Sanitary Sewer Facility	1
<b>Total 0.2% Annual Chance</b>		<b>59</b>
<b>Total Flood</b>		<b>73</b>
<b>Joliet</b>		
DFIRM Zones	Structure Type	Structure Count
Zone AE	Dwelling, single-family	3
	Water Treatment facility	1
<b>Total 1% Annual Chance</b>		<b>4</b>
<b>Total Flood</b>		<b>4</b>
<b>Red Lodge</b>		
DFIRM Zones	Structure Type	Structure Count
Zone AE	Building	1
	Dwelling, single-family	20
	Hotel / motel	2
<b>Total 1% Annual Chance</b>		<b>23</b>
0.2% Annual	Building	1
	Commercial	5
	Dwelling, multi-family	1
	Dwelling, single-family	34
	Gas station	1
<b>Total 0.2% Annual Chance</b>		<b>42</b>
<b>Total Flood</b>		<b>65</b>

<b>Carbon County</b>		
<b>DFIRM Zones</b>	<b>Structure Type</b>	<b>Structure Count</b>
Zone A	Cabin / guest house	2
	Commercial	5
	Dam site	1
	Dwelling, single-family	190
	Farm / ranch	1
	Hotel / motel	1
	Industrial	1
	Mobile home	1
	Other	1
	Restaurant	1
	Sanitary Sewer Facility	2
	State government facility	1
	Storage structure	1
	Structure	1
Telephone facility	1	
Zone AE	Commercial	1
	Dwelling, single-family	149
	Garage	1
	Mobile home	1
	Public attraction	1
	Sanitary Sewer Facility	1
<b>Total 1% Annual Chance</b>		<b>364</b>
0.2% Annual	Dwelling, single-family	30
<b>Total 0.2% Annual Chance</b>		<b>30</b>
<b>Total Flood</b>		<b>394</b>

Source: FEMA, Carbon County Assessor's Office

### **Flood Vulnerability Summary**

A summary of risk to flood by jurisdiction can be found in Table 3.26, which compares the values at risk to the total numbers and values of property in each community and unincorporated County. In regards to total possible loss the unincorporated County is at greatest risk to flooding, the Town of Fromberg has the greatest percentage of its property at risk in the floodplain. Red Lodge has a high potential loss for flooding as well, but lower when compared to the overall inventory in the City.

**Table 3.26. Summary of Vulnerability to Flood by Jurisdiction**

Jurisdiction	Total Improved Parcels	Total Parcels in 1% and 0.2% Chance Floodplain	% of Improved Parcels in Floodplain	Total Improved Value (Structure + Contents)	Value of Improved Parcels at Risk	% of Parcel Values at Risk
Bearcreek	197	3	1.52%	\$11,898,335	\$875,807	7.4%
Bridger	448	0	0%	\$65,550,000	\$0	0%
Fromberg	276	73	26.4%	\$24,768,981	\$6,713,084	27.1%
Joliet	307	4	1.3%	\$49,352,608	\$1,020,725	2.1%
Red Lodge	2,103	65	3.1%	\$639,940,273	\$31,511,524	1.9%
Carbon County	11,288	394	3.5%	\$1,612,196,686	\$207,186,861	12.9%
<b>Total</b>	<b>14,619</b>	<b>539</b>	<b>3.7%</b>	<b>\$2,403,706,883</b>	<b>\$247,308,001</b>	<b>10.3%</b>

Source: FEMA, Carbon County Assessor's Office

## Hazmat Incident

Carbon County has no Interstate Highway. Hazardous materials move through the County primarily on railroad cars and a small number of trucks. Likely scenarios for minor spills would be inadvertent discharge of small amounts of motor oil and/or weed spraying chemicals. Based on past occurrences, the most likely scenario for a hazardous material incident is a semi rollover in the Clarks Fork Valley. A semi-truck carrying diesel fuel rolled on Highway 72 in 2007. This accident caused a spill of 10,000 gallons of diesel contaminating the soil and running into an irrigation canal. Clean-up costs for the spill were approximately \$100,000. Semi accidents with fuel spills are not uncommon in the county. Many of these have occurred at "Lynn's corner" on Highway 72. The sharp curve has been redesigned and straightened during a highway project that will be completed in 2012. Accident numbers should be reduced by this action.

## Wildland Fire

Loss estimates for a wildland fire scenario are provided in Chapter V.

## Wind Event

Carbon County experiences frequent wind events. Most of the wind events cause either no damage or only small amounts of damage. On occasion, however, higher winds are present and/or gusts reach high speeds. When this occurs, some property damage is likely and personal injury is also possible. Although tornadoes do occur in the County, they are not a frequent occurrence, may not reach the ground, and historically have caused very limited damage. Due to the unpredictable nature of where tornadoes will hit it is difficult to estimate losses.



Red Lodge Mountain experienced a microburst in 2009. The microburst caused timber blowdown that damaged two county radio antennae. Two towers required replacement as a result. The associated costs were \$20,000. This type of event is not uncommon. More damaging wind events have caused roof damage, damage to electric transmission lines, power outages, damage to vegetation (forests and residential landscaping), and injuries. A more major event such as this would like cause damages in the several hundreds of thousands of dollars.

## Winter Storm

Winter storms can come over many months and display different characteristics related to amount of snowfall and/or ice, wind speeds, temperature ranges, and amount of water in snow that falls. Depending on the characteristics of any individual event, there will be different impacts and losses.

For the purposes of developing this loss estimate, one event with the following specific characteristics is postulated. The event is a late winter storm with heavy snowfall occurring widely across the south half of the County. Snowfall reaches over six feet in the southern-most mountains, three feet in the foothills and at Red Lodge, tapers to one foot at Joliet, and is six inches or less across the rest of the County. Due to the lateness in the season, the snow has high moisture content. The snow is accompanied by moderate winds. Temperatures are only slightly below freezing so that ice also forms on power lines and some pavement under snow. The storm lasts for two days.

Storms similar to this occurred in April of 2003 and May of 2005. The costs estimated in the following table are based upon the 2003 storm experience with a conservative inflation factor of approximately 25%. Impacts that could be reasonably foreseen from such an event include the following. Additional losses that are difficult to quantify would result from retail business interruption and livestock losses.

**Table 3.27. Economic Impacts of Late Winter Storm**

Impact	Number	Cost/Occur.	Comments	Total Cost
Damage to utility lines	1 storm	\$620,000	Dispatch, crews (Based on 2003)	\$62,000
Lost business Red Lodge Mtn	2,000 Skier days	\$7.50/day ave	2 days blocked roads, no skiers	\$75,000
Structure damage	5 structures	\$9375	Roof damage	\$46,875
Snow removal (2 passes) private property	700 accounts @ .75 hrs ea	\$75/hr	Residential and commercial property	\$39,375
Vehicle accidents	5 accidents (10 vehicles)	\$3,125	Fender benders	\$31,250
Snow removal and sanding for county	1 storm (2 days)	\$2500/day	Personnel, equipment, fuel	\$25,000
Snow removal and sanding for Red Lodge	1 storm (1 clearing)	\$18,750	Personnel equipment, fuel, sand	\$18,750
Snow removal and sanding, State of MT	1 storm (2 days)	\$13,750	Personnel, equipment, sand, Deicer	\$27,500



Hospital Overnights	5 nights	\$1875	Broken hip	\$9,375
Doctor visits	10 visits	\$60	Strains, sprains, slips and falls	\$6,000
Veg. Damage	20 cases	\$300	Broken limbs	\$6,000
Hospital ER visits w/ x-ray, blood work	4 visits	\$950	Slips and falls, Strains	\$3,800
Snow removal and sanding for Joliet	1 storm (1 clearing)	\$5,000	Personnel, equipment, fuel	\$5,000
Law Enforcement Calls	30 calls	\$100	Personnel time	\$3,000
Ambulance runs (local)	3 runs	\$625	Strains, falls	\$1,875
			TOTAL COST	\$36,800

Sources: Red Lodge, Carbon County, and, Joliet Public Works, Carbon County Sheriff, Treasurer, Commissioners, Beartooth Hospital, Red Lodge Ambulance, Beartooth Electric, Red Lodge Mountain, Red Lodge Area Chamber of Commerce, **Blade Runner Snow Removal**

## **CHAPTER IV: MITIGATION STRATEGY**

### **How the Goals and Mitigation Actions Were Developed**

The original PDM plan, dated 2005, had five goals and the CWPP had seven additional goals. The goals and projects in the PDM section of the plan have been reorganized and re-formatted in this 2012 plan revision. The formatting of the goals and projects in the CWPP was not changed, but completed projects were deleted and new projects identified by the Carbon County Council of Fire Chiefs were added.

The reformatting was done to make the plan easier for each local jurisdiction to identify their projects with the hope that an increased sense of ownership would improve implementation by the jurisdictions. Each jurisdiction now has one goal with objectives and projects under that goal.

The mitigation actions (projects) that follow were originally developed by the county through a series of meetings in 2005. The projects were then updated and reformatted during the 2012 revision process. The revision process included meeting with each of the six elected bodies in the county and meeting regularly with the LEPC (to develop problem statements and potential mitigation for those problems.)

Projects in this updated plan were identified from:

- the history of hazards in the county (see Chapter III),
- the probability of future occurrences,
- the vulnerability of key systems and facilities,
- the 2005 plan,
- review of other related plans,
- problem statements developed by the LEPC,
- meetings with the elected bodies of each of the incorporated communities and the board of county commissioners, and
- input from the public.

### **Hazards of Most Concern**

Based upon economic losses, wildland fire has been the most expensive type of natural disaster in the county. Earth movement (the slide on Beartooth Pass that heavily damaged the Beartooth Highway and other earth movement) was also very costly, over \$5 million for the highway reconstruction project. Flooding occurs with high frequency in the county and drought has occurred approximately one in every five years since the start of record-keeping. The county also experiences severe summer and winter storms. The most recent major

damaging event was a hail storm in the Red Lodge area in the fall of 2011. Other hazards occur less frequently and/or are less likely to produce costly damages or cause loss of life.

### **Project Costs**

Costs for mitigation actions will fall within three ranges low, medium, or high.

Low Cost Projects: from \$0 to \$5000

Medium Cost Projects: from \$5001 to \$50,000

High Cost Projects: Over \$50,000

### **Project Priorities**

Priority rankings of High, Medium, or Low were also assigned. Projects from the 2005 plan that have not been completed, are still appropriate, and are specific enough to bring forward are incorporated into the project lists. Some projects were dropped because they were too vague to determine what was intended.

Generally, the jurisdictions will initiate and depending on the complexity, try to accomplish the High priority projects within two years, the time frame for Medium priority projects will be three to four years, and Low priority projects will be accomplished by the five-year anniversary of this plan if feasible.

All projects were initially ranked by the coordinator and contractor based on the following criteria. The LEPC then validated the rankings.

- Perceived cost effectiveness and feasibility of obtaining funding,
- Level of risk to life and property posed by hazard which project addresses,
- Reasonableness of project and extent to which it provides a long-term solution,  
Potential consequences of not implementing,
- Support from the public and elected officials, and
- Compatibility with other plans and policies.

### **Project Types**

A range of types of mitigation actions or projects were identified by the participants in the planning process.

**Table 4.1 Project Types**

Goal	Project Types
Goal One—Bearcreek	Property Protection, Preparation
Goal Two—Bridger	Education, Emergency Services
Goal Three—Fromberg	Emergency Services, Prevention, Property Protection
Goal Four—Joliet	Emergency Services, Natural Resource Protection, Property Protection, Structural
Goal Five—Red Lodge	Education, Property Protection, Natural Resource Protection, Prevention, Preparation, Structural
Goal Six—Carbon County	Education, Property Protection, Prevention, Natural Resource Protection



Abandoned concrete piers in Rock Creek upstream of Joliet catch debris. This situation contributed the damaging floods in the spring of 2011. Mitigation 4.1.b would remove these piers.

Each goal statement below is part of a table giving information about the specific mitigation actions or projects. The project descriptions contain bolded lettering to identify the specific hazards addressed by the project. The project tables identify parties responsible for implementation, project priority, cost range, and potential funding sources. Projects from 2005 that are still appropriate are carried over into the following project tables. Given the limited DES staff resources, some low and medium priority projects from 2005 were dropped because there is no staff to implement them. For the current status of all of the projects in the 2005 plan, please see Appendix D.

Goals and projects related to wildland fire are listed in the Community Wildfire Protection Plan or CWPP. The CWPP is Chapter V of this document.



Bearcreek Town Council, February 2, 2012

**Table 4.2 Goal One**

**Mitigate natural hazards to reduce the potential for property loss or damage, injury and loss of life in the town of Bearcreek.**

IV-5

#	Description	Priority/ Time Frame	Cost	Responsible agency for implementation coordination and potential funding source
1.1	Objective 1: Reduce potential for <b>flood</b> damage			
1.1.a	Adopt DFIRM for Bearcreek	H	L	Town of Bearcreek County Floodplain Administrator County DES
1.1.b	Investigate benefits of applying for a grant to develop detailed floodplain map.	H	L	Town of Bearcreek. County Floodplain Administrator County DES, FEMA
1.1.c	Pursue grant above if determined advantageous	M	M	County DES
1.2.	Objective 2: Be prepared for <b>power outages</b>			
1.2.a	Insulate existing shed behind town hall or build a new shed to store portable backup generator inside.	M	L	Town of Bearcreek  County DES

**Table 4.3 Goal Two**

**Mitigate natural hazards to reduce the potential for property loss or damage, injury and loss of life in the town of Bridger.**

IV-6

#	Description	Priority/ Time Frame	Cost	Responsible agency for implementation coordination and potential fund source
2.1	Objective 1: Raise awareness to make citizens safer from <b>all natural hazards.</b>			
2.1.a	Put a seasonal safety message on the water bills twice/year—suggestions to cover <b>winter weather and wildland fire.</b>	M	L	Town of Bridger, Clerks Office
2.1.b	Go live with Bridger Police Department web pages and link to county emergency information	M	L	Bridger Police Chief
2.2	Objective 2: Maintain emergency communications			
2.2..a	Purchase narrowband radio for police to comply with switch from analog.	H	M	Town of Bridger County DES

**Table 4.4 Goal Three  
Mitigate natural hazards to reduce the potential  
for property loss or damage, injury and loss of life in the town of Fromberg.**

#	Description	Priority/Time Frame	Cost	Responsible agency for implementation coordination and potential fund source
3.1	Objective 1: Reduce potential for <b>flood</b> damage			
3.1.a	Adopt new DFIRM.	M	L	Town of Fromberg
3.1.b	Obtain back-up power to operate water and wastewater facilities during <b>power outages</b> .	H	M	Town of Fromberg County DES
3.2	Objective 2: Improve <b>structural fire</b> protection			
3.2.a	Evaluate fire hydrant coverage of town. Add/replace hydrants as indicated. (12)	M	M	Town of Fromberg County DES
3.2.b	Install additional waterline under RR tracks. (Damage to existing line would leave entire town without water.)	M	H	Town of Fromberg County DES
3.2.c	Install separate waterline from storage tank to school.	M	M	Town of Fromberg County DES
3.3	Objective 3: Maintain emergency communications during disasters			
3.3.a	Purchase narrowband radio for police to comply with switch from analog.	H	L	Fromberg Police Chief County DES

IV-7



**Table 4.5 Goal Four**

**Mitigate natural hazards to reduce the potential for property loss or damage, injury and loss of life in the town of Joliet.**

8-V

#	Description	Priority/ Time Frame	Cost	Responsible agency for implementation coordination and potential fund source
4.1	Objective 1: Reduce potential for <b>flood</b> damage			
4.1.a	Adopt new DFIRM.	H	L	Town of Joliet
4.1.b	Remove unused piers in Rock Creek south of Joliet	H	M	Town of Joliet, Montana DES, FEMA
4.1.c	Relocate water pressure tank to the other side of creek	M	H	Town of Joliet County DES
4.1.d	Monitor Rock Creek stream channel movement and protect town's lagoon with stream structures.	M	H	Town of Joliet Montana DES, FEMA
4.1.d	Monitor Rock Creek stream channel movement. Protect Joliet-Fromberg bridge/road with stream structures.	M	M	Town of Joliet Montana DES, FEMA
4.2	Objective 2: Improve communications for <b>all hazards</b>			
4.2.a	Replace warning siren on town hall	H	L	Town of Joliet, County DES
4.2.b	Purchase 2 mobile, 3 handheld digital radios for conversion	H	M	Town of Joliet County DES
4.3	Objective 3: Reduce <b>vegetative hazard</b>			
4.3.a	Address tree hazard along abandoned ditch, north side	M	M	Town of Joliet
4.4	Objective 4: Be prepared for <b>power outages</b>			
4.4.a	Support county purchase of mobile back-up generator	M	L	Town of Joliet

**Table 4.6 Goal Five**

**Mitigate natural hazards to reduce the potential for property loss or damage, injury and loss of life in the city of Red Lodge.**

6-N

#	Description	Priority/ Time Frame	Cost	Responsible agency for implementation coordination and potential fund source
5.1	Objective 1: Reduce potential for <b>flood</b> damage.			
5.1.a	Adopt new DFIRMs.	H	L	City of Red Lodge
5.1.b	Prepare storm water drainage plan for city.	M	H	City of Red Lodge County DES
5.1.c	Remove abandoned concrete piers in Rock Creek at Island at Rock Creek to prevent <b>ice jam floods</b> .	L	M	City of Red Lodge County DES, FEMA
5.1.d	Remove abandoned concrete piers in Rock Creek at 8 <sup>th</sup> Street to prevent <b>ice jam floods</b> .	M	M	City of Red Lodge County DES, FEMA
5.2	Objective 2: Reduce potential for structure damage and loss of life from <b>wind, other natural hazards, and hazmat</b> .			
5.2.a	Maintain building inspection program. Adopt revisions to IBC and IRC as appropriate.	H	M	City of Red Lodge
5.2.b	Encourage owner of natural gas distribution facility to relocate tanks outside of city limits	M	L	City of Red Lodge
5.3	Objective 3: Reduce <b>vegetation hazard</b> from wind.			
5.3.a	Remove hazard trees and branches in city parks.	M	M	City of Red Lodge

#	Description	Priority/ Time Frame	Cost	Responsible agency for implementation coordination and potential fund source
5.4	Objective 4: Be prepared for conducting evacuations			
5.4.a	Review contents of EAP for <b>failure of Glacier Lake Dam</b> with DES every other year.	M	L	City of Red Lodge Emergency Mgmt Committee, County DES
5.4.b	Develop procedures for evacuation of town from a <b>wildland fire.</b>	L	L	City of Red Lodge Fire Chief

IV-10



Fromberg Town Council, February 13, 2012

**Table 4.7 Goal Six**

**Mitigate natural hazards to reduce the potential for property loss or damage, injury and loss of life in the unincorporated areas of Carbon County.**

#	Description	Priority/ Time Frame	Cost	Responsible agency for implementation coordination and potential fund source
6.1	Objective 1: Reduce potential for <b>flood</b> damage			
6.1.a	Install an automated gauging station in Rock Creek south of Red Lodge.	M	L	County DES
6.1.b	Monitor channel changes and protect critical infrastructure (Two Mile Bridge and road and the Red Lodge sewer lagoons) from flooding on the north end of Red Lodge.	L	M	Carbon County County DES, MT DES, FEMA
6.1.c	Replace the dike in Rock Creek at the end of Grapevine Road	L	M	Property owners' District
6.1.d	Post DFIRMs on the County website.	H	L	County DES
6.1.e	Remove bridge abutments from floodplain when county bridges are replaced	L	H	County Road Dept. County DES, FEMA
6.1.f	Continue to provide information to property owners about building in the floodplain	H	L	County Floodplain Administrator
6.1.g	Provide educational materials about <b>flood</b> insurance—what is covered by what types of policies	M	L	County DES

IV-11

#	Description	Priority/ Time Frame	Cost	Responsible agency for implementation coordination and potential fund source
6.2	Objective 2: Address <b>oil and gas pipeline hazards</b> .			
6.2.a	Continue to provide training for responders in conjunction with pipeline companies	M	L	County DES Conoco-Phillips Pipeline Co
6.2.b	Address issues with pressurized natural gas line crossing Rock Creek south of Roberts.	H	L	County DES Northwestern Energy
6.3	Objective 3: Improve communications during <b>all natural hazard disasters</b>			
6.3.a	Develop emergency notification system	H	M	County DES, Sheriff
6.3.b	Complete implementation of E-911	H	M	County DES, Sheriff
6.3.c	Complete the conversion of radios to narrow band	H	H	County DES, LEPC
6.3.d	Relocate the fiber optic line from Billings to Red Lodge to reduce vulnerability	M	M	Century Link
6.3.e	Continue to broadcast weather warnings through dispatch	H	L	Sheriff
6.3.f	Develop the DES page of the county's website to provide information about emergency management	M	L	County DES

#	Description	Priority/ Time Frame	Cost	Responsible agency for implementation coordination and potential fund source
6.4	Objective 4: Be prepared for winter storms.			
6.4.a	Purchase one back-up generators on trailers that can be moved to shelter or critical infrastructure locations.	M	M	County DES
6.4.b	Maintain shelter agreements with American Red Cross	H	L	County DES
6.4.c	Host NWS weather spotter training in county annually	M	L	County DES
6.5.d	Invite NWS to make presentations in the schools	M	L	County DES, County Superintendent of Schools
6.5	Objective 5: Enhance emergency planning for <b>all natural disasters</b>			
6.5.a	Prepare a strategic plan for the LEPC including clarification of purpose and identification of roles and responsibilities	H	M	County DES
6.6	Objective 6: Coordinate with public health emergency planning	H	L	County DES, LEPC, Public Health
6.1	Participate as requested in the development of public health emergency plans	M	L	County DES, LEPC, Public Health
6.2	Include public health in disaster response exercises	H	L	County DES, LEPC, Public Health

## **Reducing Effects of Hazards on Existing Buildings and Infrastructure**

This PDM/CWPP update contains a range of types of projects, including some projects that will reduce the effects of natural hazards on existing buildings and infrastructure. Projects 1.1.a, 3.1.a, 3.2.a, 3.2.b, 4.1.a, 4.1.b, 4.1.d, 4.3.a, 5.1.a, 5.1.b, 5.1.c, 5.1.d, 5.3.a, 6.1.c, 6.1.e, and 6.3.d reduce the effects of hazards on existing buildings and infrastructure. Additional projects under goals 1 and 3 in the CWPP (Chapter V) also reduce the effects of hazards on existing buildings and infrastructure.

## **Reducing Effects of Hazards on New Buildings and Infrastructure**

Projects 1.1.a, 1.1.b, 3.1.a, 3.2.a, 4.1.a, 4.1.b, 4.3.a, 5.1.a, 5.1.b, 5.1.c, 5.1.d, 5.2.a, and 6.1.e will assist in protection of future buildings and infrastructure. Additional projects under goals 1 and 3 in the CWPP (Chapter V) also reduce the effects of hazards on new buildings and infrastructure.

## **Project Selection and Implementation**

Some of the projects identified above are carried over from the 2006 plan and are already underway and on-going. The jurisdictions will need to revisit and determine the priority of the identified mitigation actions for their jurisdictions on an annual basis in light of the available resources. Viable projects from the original 2006 plan that were not already completed have been carried forward in this plan and are shown in the goal tables. Accomplishments of these projects can be monitored along with the new projects added in 2012.

Each spring prior to the annual budget setting, the Carbon County Disaster and Emergency Services Coordinator will contact the mayors of Bearcreek, Bridger, Fromberg, Joliet, and Red Lodge, and the chair of the Board of County Commissioners by letter or appearance at a regularly-scheduled meeting. The purpose of the contacts will be to update the elected officials on projects in the plan, request the local jurisdictions' project priorities for the coming year, and determine any support needed from Carbon County DES. The county can assist in applying for grant funds, and obtaining information, training, and technical expertise. Projects will be undertaken and accomplished as resources are available. Resources include such things as funding, staff time, and technical expertise.

## **Use of Cost-Benefit Analysis**

The county can also make available information regarding the STAPLEE method for evaluating and prioritizing mitigation actions. The method looks at social, technical, administrative, political, legal, economic, and environmental aspects of projects to weigh pros and cons of implementing specific projects. Information on this analysis method can be found in FEMA's *Developing the Mitigation Plan* (FEMA 386-3). The jurisdictions will need to consider compatibility with goals and objectives in the state's plan, compatibility with goals in this plan, impacts of the project on other jurisdictions, costs and benefits, funding priorities, and compatibility with other plans and programs when selecting projects to implement.

# Chapter 5: Community Wildfire Protection Plan (CWPP)

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## 5.1. Executive Summary

The CWPP was developed simultaneously with the preparation of the county's Pre-disaster Mitigation Plan. The Local Emergency Planning Committee (LEPC) oversaw the preparation of Pre-Disaster Mitigation (PDM) plan, but the specifics in the CWPP were developed by the members of the Carbon County Fire Council with research and writing assistance from the contractor.

Located in south central Montana, the County encompasses 2,060 square miles of land ranging from 3,300 to 12,799 feet above sea level. The variation produces significant diversity in vegetative cover, precipitation, topography, and land use. Land is owned by private individuals, corporations, the state of Montana, local and federal government. Federal lands are managed by the Bureau of Land Management, the US Forest Service, the National Park Service, and the US Fish and Wildlife Service. Five incorporated communities are located in the county; Bearcreek, Bridger, Fromberg, Joliet, and Red Lodge.

Fuel types vary from grasses, to sage brush, to scattered timber, to dense timber depending on aspect and elevation. There is tremendous variety in fuel types and fuel loading across the county. The most extreme situation with respect to fuel conditions and values at risk occurs south and west of Red Lodge where there are numerous high-value individual homes and subdivisions located in the Wildland Urban Interface (WUI) area in close proximity to the National Forest boundary. The WUI poses tremendous risks to life, property and infrastructure in associated communities and is one of the most dangerous and complicated situations faced by firefighters. While only 13% of the County is classified as WUI, a significant amount of development (2,552 structures (37%) and 66 residential subdivisions) has occurred in these areas.

Carbon County has nine rural fire districts which respond to both structure and wildland fires within 76% of the County. The remaining 24% (489 sqmi.) of land in the southeast corner of the County has no formal fire protection. Fire district profiles are included in this CWPP.

A total of 402 fires have occurred on federal lands or have had federal agency response from 1980 to 2011. Thirty seven of these burned over 100 acres in the County during this time period. Approximately 56% had a natural ignition while 38% were caused by human activity. Many other fires have occurred on private lands over the years, but are not well documented. Relatively higher numbers of lightning starts occurred in the Pryor Mountains and the higher mountainous country south and west of Red Lodge. Human-caused ignitions occurred along roadways and near rural residences. Power line ignitions occurred where the lines were exposed to high winds. Railroad ignitions occurred along the tracks in the northern and eastern portions of the county. The county has little history of arson activity.

Fire mitigation goals, objectives and projects were reviewed and ranked as part of this CWPP. Accomplishment of projects will depend on the availability of resources and funding.

## 5.2. Background

Community Wildfire Protection Plans (CWPP) are authorized and defined in Title I of the Healthy Forests Restoration Act (HFRA) passed by Congress on November 21, 2003, and signed into law by President Bush on December 3. The HFRA is the legislative component of President Bush's Healthy Forests Initiative. Title I of the HFRA authorizes the Secretaries of Agriculture and the Interior to expedite the development and implementation of hazardous fuel reduction projects on federal lands managed by the USDA Forest Service and the Bureau of Land Management, when they meet certain conditions.

The HFRA also emphasizes the need for federal agencies to work collaboratively with communities in developing hazardous fuel reduction projects, and places priority on treatment areas identified by communities themselves in a CWPP. This provides communities with a tremendous opportunity to influence where and how federal agencies implement fuel reduction projects on federal land, as well as how additional federal funds may be distributed for projects on nonfederal lands.

This Community Wildfire Protection Plan was prepared as a part of Carbon County's pre-disaster mitigation (PDM) plan to make the county more disaster-resistant. The plan simultaneously meets requirements for pre-disaster project funding and post-disaster assistance from the Federal Emergency Management Agency to assess risks and vulnerabilities, and identify locally-supported actions that can be taken to reduce the potential for loss and damage in the event of a natural disaster.

The original PDM plan, prepared in 2005, was guided by a CWPP/PDM Steering Committee consisting of local, county, state and federal representatives. The steering committee guided the development of the entire document, while the Carbon Fire Council guided the development of Chapter 5 containing the fire elements of the plan. Participants in the fire planning process included:

- Belfry, Rural Fire District No. 9
- Bridger, Rural Fire District No. 2
- Edgar, Rural Fire District No. 4
- Fromberg, Rural Fire District No. 3
- Joliet, Rural Fire District No. 1
- Red Lodge, Rural Fire District No. 7
- Roberts, Rural Fire District No. 6
- Absarokee, Rural Fire District
- Laurel, Rural Fire District
- Bureau of Land Management
- Custer National Forest
- MT Dept. of Natural Resources and Conservation

The revision of the CWPP involved two meetings of the Carbon County Fire Council (January 19, 2012 in Fromberg and April 19, 2012 in Bridger). Sign-in sheets for the meetings can be found in Appendix A. In between the Fire Council meetings, the planning consultant conducted interviews and had several conversations with participants to obtain input for both the assessment, and the mitigation goals and projects sections.

The area evaluated in this assessment is Carbon County, Montana. The county has nine rural fire districts, five incorporated communities and a number of unincorporated communities. The incorporated communities are the towns of Bearcreek, Bridger, Fromberg, Joliet, and the

City of Red Lodge. For more detailed information about the characteristics of Carbon County please refer to Chapter I of this plan.

### 5.2.1 Historic Occurrences of Wildland Fires

The newspaper account was located for the largest historic fire in recent memory. This fire occurred in 1948 in the main canyon of Rock Creek south of Red Lodge. The headline in the Carbon County News dated September 19, 1948 read “Disastrous Fire Burning in Red Lodge Canyon.” The article went on to report that the fire started on September 13 and was caused by two careless fishermen. The fire was a reported 7,000 acres at press time. The majority of the upper canyon was burned including timber and cabins. The Richel Lodge and Lions Camp on the Lake Fork were endangered and smoke was drifting over the Beartooth Highway making driving difficult. On September 21, the News reported the fire was under control “after extensive damage.”

### 5.2.2 Federal Fire Occurrence Database

The Federal Fire Occurrence Website (US Geologic Survey, 2012) is a government website that provides users with the ability to query, view and download wildland fire occurrence data. The Website contains over 630,000 fire records collected by Federal land management agencies for fires that occurred from 1980 through 2010 in the United States. The location and size of these fires in Carbon County are shown in Figure 5-1 in combination with major fire perimeters from GeoMAC (Geospatial Multi-Agency Coordination Group (GeoMAC), 2012). This map does not reflect fires that occurred on private lands where only the rural fire departments responded.

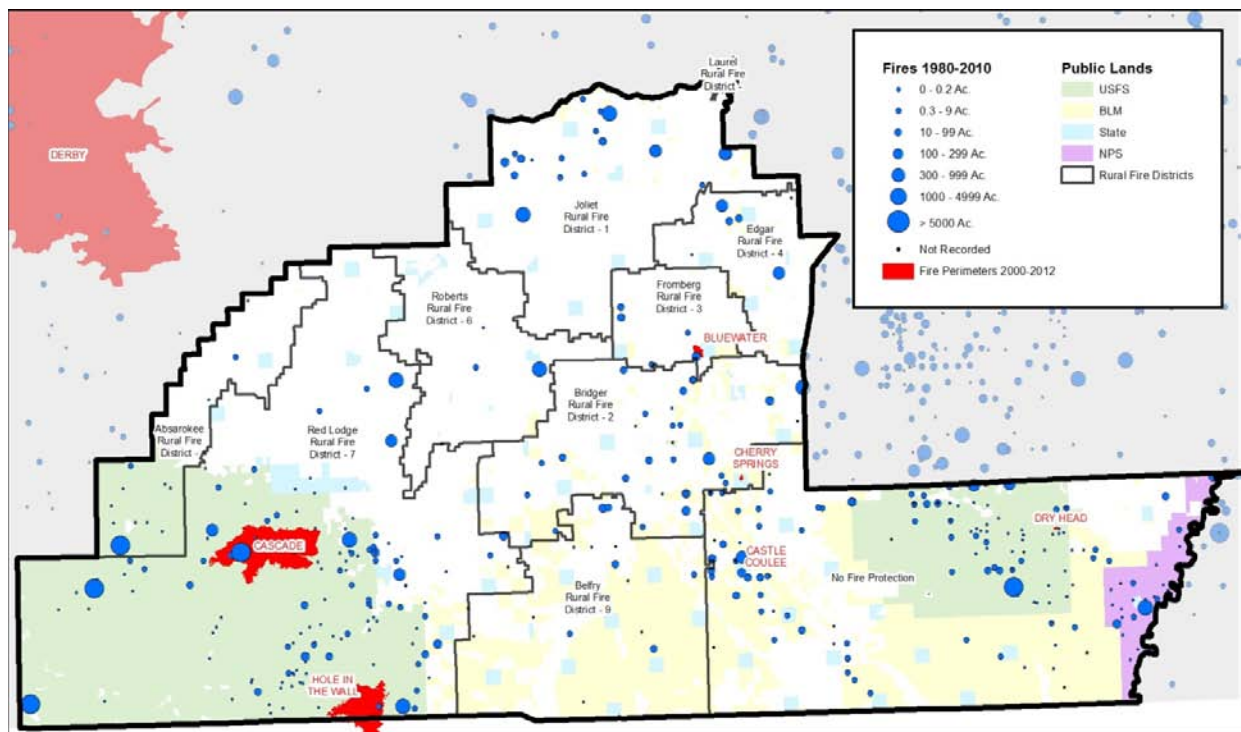


Figure 5-1. Map of Carbon County showing historical fire locations and perimeters in relation to rural fire districts and public lands.

Combing the Federal Occurrence Website data with 2011 data from the Custer National Forest, a total of 402 fires have occurred on federal lands or have had federal agency response from 1980 to 2011. Table 5-1 lists the 37 fires that burned over 100 acres in the County during this time period based on these two sources of information.

Of the 402 fires that occurred in the County, approximately 56% had a natural ignition while 38% were caused by human activity (7% were not classified).

**Table 5-1. Fires in Carbon County in excess of 100 acres between 1980-2010 (US Geologic Survey, 2012)**

AGENCY	FIRE	CAUSE	YEAR	ACRES	FIRE DISTRICT
FS	HOLE IN THE WALL	Natural	2011	3,777	Red Lodge Rural Fire District
BLM	BLUEWATER	Human	2010	274	Fromberg Rural Fire District
BLM/FS	ANTELOPE	Human	2009	100	
BLM	DRY CREEK	Human	2009	222	Belfry Rural Fire District
FS	LARKIN MUTUAL AID	Natural	2009	131	Red Lodge Rural Fire District
FS	SILESIA ASSIST	Human	2009	500	Joliet Rural Fire District
FS	CASCADE	Human	2008	10,173	Red Lodge Rural Fire District
FS	ROCK QUARRY	Natural	2008	300	Edgar Rural Fire District
BLM	421	Human	2007	200	Joliet Rural Fire District
BLM/FS	FAREWELL	Human	2007	521	Joliet Rural Fire District
FS	COLE CREEK	Natural	2006	1,000	Joliet Rural Fire District
BLM	PIPELINE	Natural	2006	200	Bridger Rural Fire District
FS	SHANE RIDGE	Natural	2006	1,000	Joliet Rural Fire District
FS	TURKEY	Human	2006	410	Red Lodge Rural Fire District
NPS	E TRAIL CR	Human	2005	1,500	
BLM/FS	RED WAFFLE	Human	2002	5,859	
BLM	SORENSEN	Human	2001	175	
BLM	WILLIE	Human	2000	1,503	Red Lodge Rural Fire District
BLM	CARBONCOAS	Human	1999	500	Edgar Rural Fire District
BLM	GOLD CRK	N/A	1999	190	Red Lodge Rural Fire District
BLM	CHERRY SPG	Natural	1998	2,000	Roberts Rural Fire District
BLM	DEPRESSION	Human	1998	200	
FS	PARKSIDE	Human	1998	133	Red Lodge Rural Fire District
BLM	SURPRISE	Human	1997	100	Bridger Rural Fire District
BIA	CABINS	Human	1996	430	
BIA	HOLEINROCK	Natural	1996	200	
FS	SHEPARD MTN	Natural	1996	14,890	Absarokee Rural Fire District
BLM	VIADUCT	Human	1996	230	
BIA	CROWN BUTTE	Natural	1995	700	
BLM	WEST PRYOR	Natural	1995	1,800	Bridger Rural Fire District
BLM	BRIDGER	Human	1991	200	Bridger Rural Fire District
BLM/FS	ROBERTSON DRAW	Human	1991	4,360	Red Lodge Rural Fire District
FS	UNNAMED	Human	1990	204	Red Lodge Rural Fire District
FS	UNNAMED	Natural	1990	910	Red Lodge Rural Fire District
BLM	AGAIN	Human	1989	300	
FS	CLOVER/MIST	Human	1988	387,400	Red Lodge Rural Fire District
BLM	BOWLER FIR	Human	1983	650	Bridger Rural Fire District

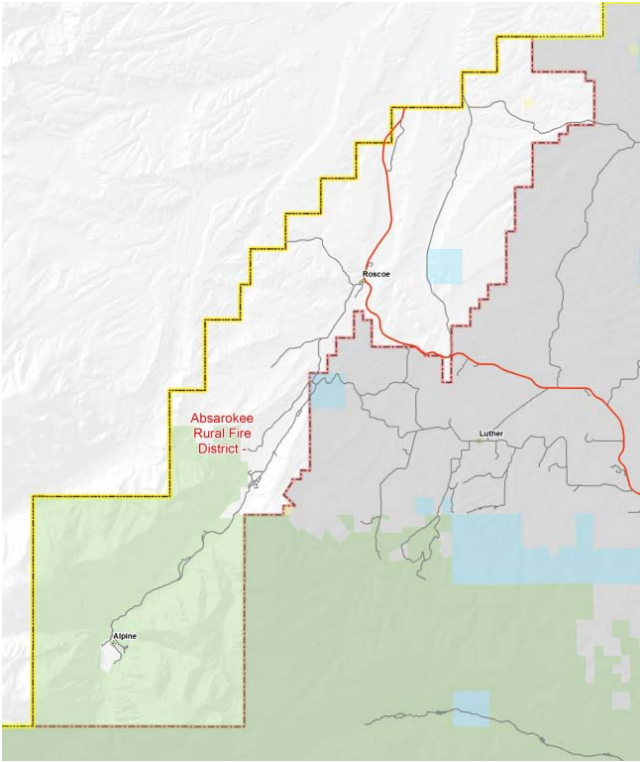
### 5.3. Fire Districts and Community Assessments

Carbon County has nine Rural Fire Districts (RFD) which respond to both structure and wildland fires within 76% of the County. The remaining 24% (489 sq. mi.) of land in the southeast corner of the County has no formal fire protection. Primary fire response for two of the districts comes from outside the County. Mutual aid agreements are in place between the County and Laurel and Absarokee RFD to support cross-boundary response.

The following “profiles” summarize key information for each RFD. Specifically, the profiles list the station contact information and address, the number of paid positions/volunteers in the RFD, the area covered and the number of structures within the RFD, population estimates from the 2010 census, the Insurance Services Office (ISO) rating, and a summary of land ownership.

#### 5.3.1 Absarokee Rural Fire District

Fire District Profile	
Station Address	PO Box 302 105 W B St Absarokee, MT 59001
Substations	N/A
Fire Chief	Tim Zumbrum
Paid Positions	N/A
Volunteers	19 (11 active)
Area Served	64,904 Ac / 101 SqMi
Population	153
Structures	258
ISO Rating	6 in Absarokee; 8 for residences 2-5 miles out; 10 elsewhere in District
Land Ownership	57% Private, 42% Federal, 1% State



The map displays the geographical boundaries of the Absarokee Rural Fire District. The district's area is outlined with a yellow border, while the specific fire service area is marked with a red border. Key locations shown include Roscoe, Luther, and Alpine. The terrain is depicted with green and grey shading, and a road network is visible.

Fire protection responsibility for this District is contracted with the Absarokee Fire Department in Stillwater County. This area includes the unincorporated community of Roscoe (population 15), the Black Butte Subdivision, the private and state-owned lands north of the Forest Service boundary, and the upper end of Butcher Creek north of State Highway 307.

Ownership of the land in the District is mostly private (57%) and federal (42%) which is managed by the US Forest Service.

The East Rosebud drainage and the Alpine area within the Forest Service boundary, which includes homes around East Rosebud Lake, have no formal fire protection for structures. The Custer National Forest has the primary wildland fire protection responsibility in this area under Affidavit Agreements with the various landowners (Kurk, 2004).

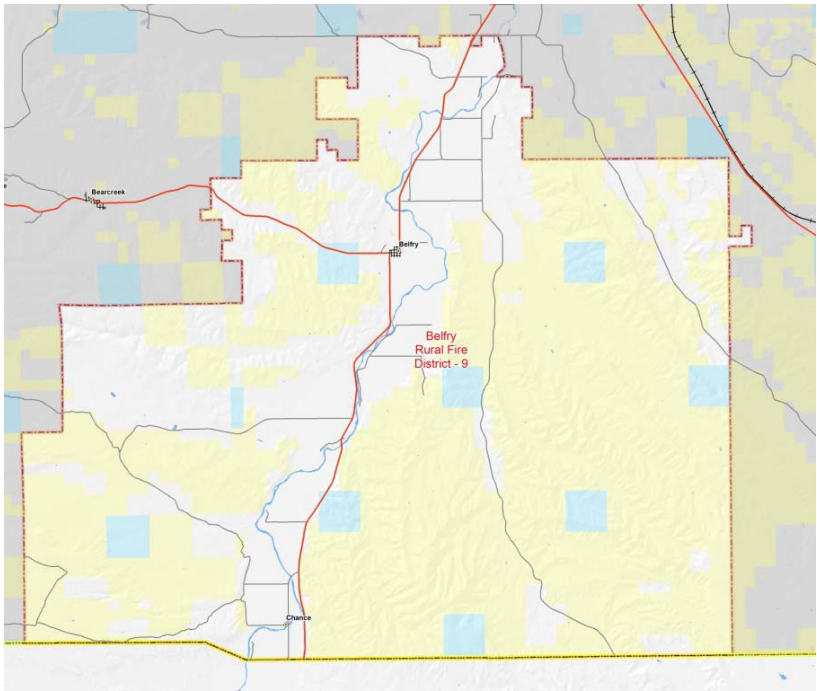
Challenges in providing protection come from the steep terrain, poor access, and heavy fuels in the southern end of the district, the East Rosebud. There is only one road in and out and the road is not well maintained. Many of the residential subdivisions in this area have limited egress and some access roads have limited bridge capacity (Zumbrun, 2012).

This district has wildland urban interface issues along the face of the Beartooth Front and National Forest boundary. According to the former Chief, the homes in the interface are difficult to protect because they have difficult access and heavy fuels (Noe, 2004). It is important that fuels mitigation continue on US Forest Service lands adjacent to private property (Zumbrun, 2012). Zumbrun also felt that homeowners in the area were doing an adequate job of creating defensible space around their private residences.

By contrast, the Butcher Creek drainage fuels consist of grasses that are cropped by domestic livestock (Noe, 2004). Average annual precipitation in the area is 18 to 20 inches. Risk of ignition within Roscoe is low. Risk of ignition outside of the community is medium to high (Noe, 2004).

### 5.3.2 Belfry Rural Fire District 9

Fire District Profile	
Station Address	PO Box 66, 100 State St Belfry, MT 59008
Substations	N/A
Fire Chief	Greg Maddox
Paid Positions	N/A
Volunteers	13
Area Serviced	126,115 Ac / 197 SqMi
Population	512
Structures	263
ISO Rating	6
Land Ownership	60% Federal, 35% Private, 4% State





Belfry Rural Fire District #9, located in Belfry, protects the community of Belfry (population 218) and surrounding rural residences. It also protects the Elk Basin industrial area located south and east of Belfry. Elk Basin is an oil producing area that contains an Exxon tank battery.

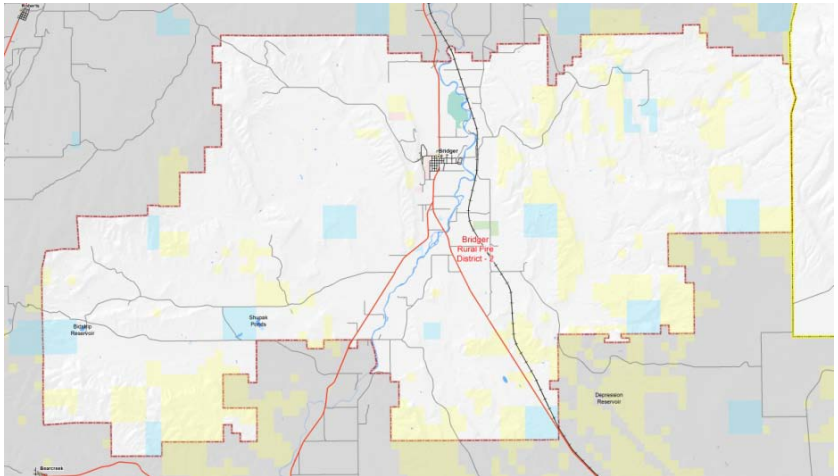
Belfry is an unincorporated area situated in the south end of the county along the Clarks Fork River and at the intersection of Highways 72 and 308. Much of the area surrounding the community is irrigated agricultural land. Fuels in the area outside of the community and out of the river valley bottom are grasses and sagebrush. The river bottom has scattered cottonwoods and brush. Average annual precipitation for the Belfry area ranges from less than 6 to 8 inches.

The federal government, under the management of the Bureau of Land Management (BLM) owns 60% of the land in the district. Lands owned by the State of Montana account for 4%. The remaining 35% is in private ownership.

Ignition concerns for this area of the county include lightning strikes in late summer when vegetation is dry, escaped fires from ditch burning by landowners in the spring, and starts along the highway. The risk of Ignition within the community is low. However, in areas outside the community risk of ignition is medium (Maddox, 2004).

### 5.3.3 Bridger Rural Fire District 2

Fire District Profile	
Station Address	PO Box 60 200 E Carbon Ave Bridger, MT 59014
Substations	N/A
Fire Chief	Vern Adkins
Paid Positions	N/A
Volunteers	25
Area Served	122,860 Ac / 192 SqMi
Population	1,274
Structures	625
ISO Rating	4 or 5
Land Ownership	79% Private, 15% Federal, 5% State



Bridger Rural Fire District #2 includes the incorporated town of Bridger which is situated in the Clarks Fork Valley along Highway 72. The population of Bridger in the 2010 census was 708, down 5% from 2000. Much of the immediate surrounding area is irrigated and in agricultural production. Where the area is not farmed near the town, the fuels are limited to grasses.

Drought and wind conditions can contribute to increased severity of wildland fire. Average annual precipitation for the area is between 10 and 14 inches.

The volunteer department, located in Bridger, protects both the town and surrounding area. Within town, there is a bulk fuel plant, restaurants, a commercial area, and residences. In addition to the town, the Bridger Department protects the bean elevator east of town, the Eagle Nest Estates Subdivision, the state fish hatchery in Blue Water Creek, rural residences, farm and ranch residences, outbuildings, and the airport. Risk of ignition within and immediately surrounding the community is low.

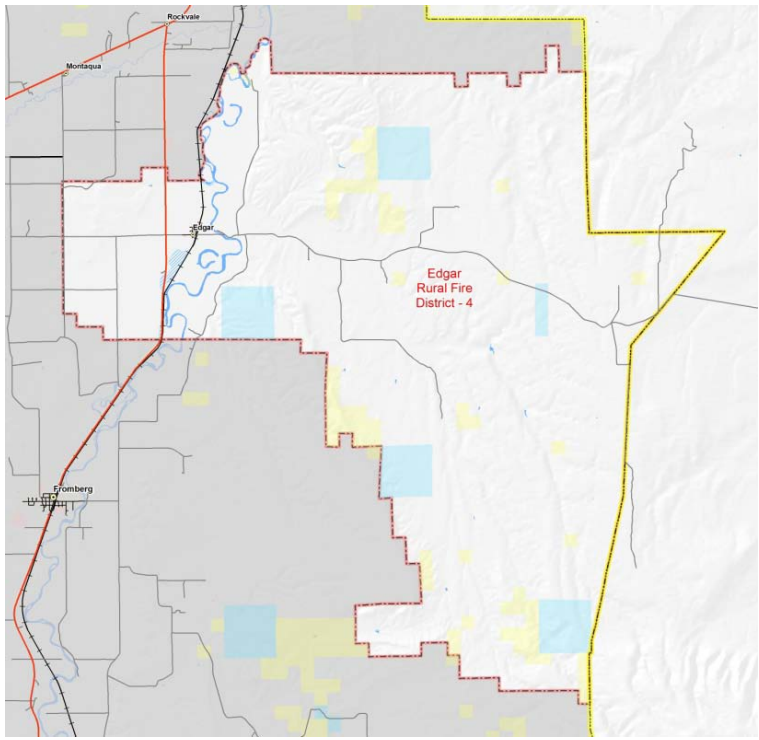
Land ownership within the District consists of 79% private, 15% federal (BLM) and 5% state.

East of the District, are lands that are not included in the coverage responsibility of any department. Over 70% of the land in this “unprotected” area is owned by the federal government (US Forest Service, BLM and National Park Service) and State of Montana.

According to Chief Adkins, his department will respond when a fire is reported in this uncovered area. He reports that because there are few fires in this area it does not represent a major concern for him (Adkins, 2005).

#### 5.3.4 Edgar Rural Fire District 4

Fire District Profile	
Station Address	PO Box 14, 222 N Railway Ave Edgar, MT 59014
Substations	N/A
Fire Chief	Dave Wetstein
Paid Positions	N/A
Volunteers	12
Area Serviced	49,771 Ac / 78 SqMi
Population	250
Structures	124
ISO Rating	9
Land Ownership	89% Private, 5% Federal, 5% State



The map displays the geographical boundaries of Edgar Rural Fire District 4. The district's perimeter is outlined in red, with a yellow line indicating a specific boundary or sub-section. Key locations marked on the map include Montiqua, Rockvate, and Cronberg. The terrain is shown with topographic contours, and various colored areas (blue and yellow) represent different land ownership types or features within the district's service area.

The Edgar Rural Fire District #4 maintains a volunteer department located in Edgar and has protection responsibility for the unincorporated town of Edgar, rural structures, a fertilizer plant east of Edgar, and the Express Pipeline and pumping station. Edgar (population 114) is

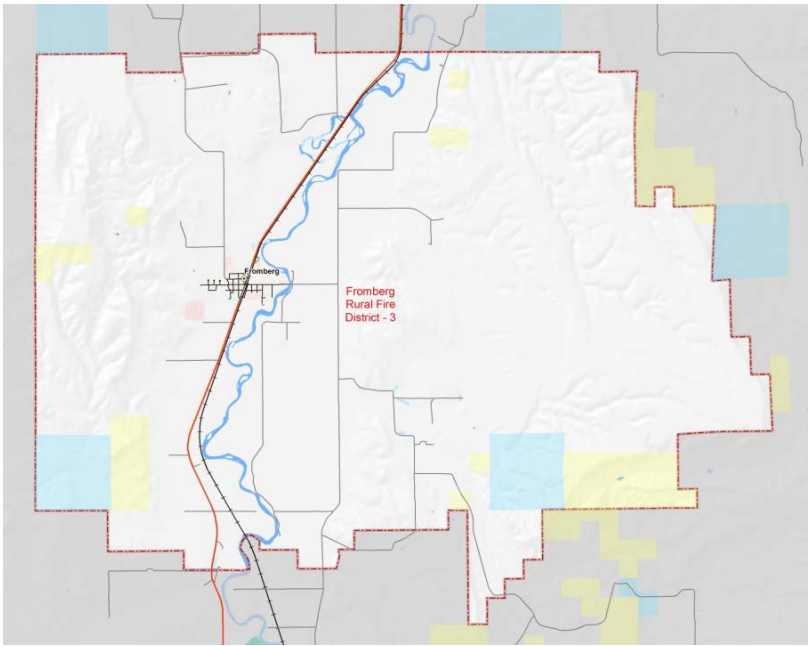
situated on the Clarks Fork River and State Highway 310. The town itself is well-protected from wildland fire by farm ground (Wetstein, 2004). With the exception of cottonwoods along the river bottom, there is not much timber in the district. Fuels consist of grasses and brush. In many areas the fuels have accumulated due to the fact that lands are enrolled in the Conservation Reserve Program (CRP.) Except under emergency conditions, lands enrolled in CRP are not grazed or hayed. Average annual precipitation in Edgar is 10-14 inches.

Land ownership in the District is predominantly private (89%), with some scattered State (5%) and BLM (5%) lands.

Providing fire protection in many locations in the district is a challenge owing to the difficulty of finding physical access across open land with broken terrain. The department has also had difficulty recruiting adequate numbers of personnel. Risk of ignition within and surrounding the community is low (Wetstein, 2004).

### 5.3.5 Fromberg Rural Fire District 3

Fire District Profile	
Station Address	PO Box 194 Physical... Fromberg, MT 59029
Substations	N/A
Fire Chief	Gary Hart
Paid Positions	N/A
Volunteers	10
Area Serviced	35,624 Ac / 56 SqMi
Population	745
Structures	376
ISO Rating	9
Land Ownership	90% Private, 4% Federal, 4% State



The map displays the geographical layout of Fromberg Rural Fire District - 3. A red dashed line delineates the district's irregular boundary. The Clarks Fork River is shown as a blue line winding through the center of the district. The terrain is depicted with a grayscale relief map, showing a mix of flat and hilly areas. Several colored polygons (yellow and light blue) are overlaid on the map, likely representing different land ownership types or fire risk zones. A small cluster of buildings and a road are visible near the center, representing the town of Fromberg. A legend in the bottom right corner of the map area identifies the district as 'Fromberg Rural Fire District - 3'.

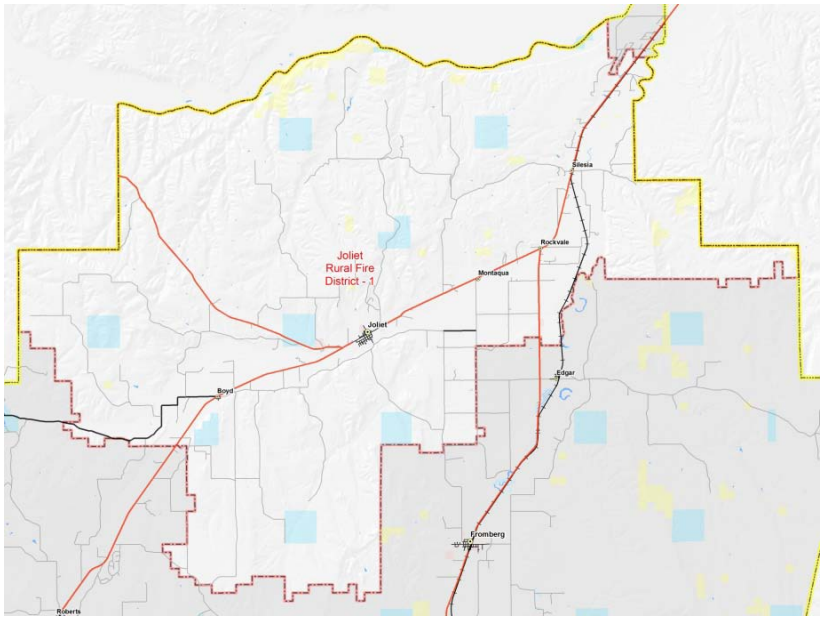
Fromberg Rural Fire District #3, a volunteer department located in Fromberg, provides protection for the town of Fromberg, a grain elevator, and along the BNSF railroad tracks. The population of Fromberg decreased 10% to 438 residents from 2000 to 2010. The town is situated along the Clarks Fork River and Highway 310. The town itself is protected from wildland fire by farm ground. Average annual precipitation is 10-14 inches. Access across some farm land is difficult due to irrigation ditches, pipelines, and saturated soils. Lands to the east and west of town that are out of the river bottom are rough, difficult to access, and contain light flammable fuels. The severity is enhanced by persistent winds.

Land ownership in the District is predominantly private (90%), with some scattered BLM lands (4%) and two State school sections (4%).

Of particular concern in this area of the county is the ditch, weed, and stubble burning done annually by landowners. Not all landowners are attentive to their burns and some escape. The railroad also is a source of ignitions in this district. Risk of ignition in the town of Fromberg is low (Hart, 2004).

### 5.3.6 Joliet Rural Fire District 1

Fire District Profile	
Station Address	PO Box 60 200 E Carbon Ave Bridger, MT 59014
Substations	Silesia
Fire Chief	Melvin Hoferer
Paid Positions	N/A
Volunteers	20
Area Serviced	135,537 Ac / 212 SqMi
Population	2,172
Structures	1029
ISO Rating	9
Land Ownership	93% Private, 4% State, 2% Federal



The protection responsibilities of the Joliet Rural Fire District #1 include the incorporated town of Joliet (pop. 595); the communities of Boyd (pop. 35), Silesia (pop. 96); Rockvale; Major subdivisions including the Grill, Bridal Trails, and Evergreen; Klammerts Railroad Tie Yard, agricultural chemical operation and airstrip; residences along Rock Creek, residences in scattered pines on the western edge of the county on Ortiz Lane, and the railroad tracks along the Clarks Fork.

Private lands are dominant (93%) with a small percentage of State (4%) and BLM (2%) lands present.

The fuel situation in the district is mixed. Most of the subdivisions and communities are near green, irrigated cropland along river/creek bottoms. Average annual precipitation in the general area is 10-14 inches. Residential development north and west of Joliet (including Ortiz Lane) is situated in the hills with scattered Ponderosa pine and is considered WUI. Little or no water is available in this area.



The Grille Subdivision just west of Joliet is grassy, rolling hills with a few scattered pine trees. Poor access exists in the Shane Ridge area along Highway 421 between Joliet and Columbus and response time can be as long as 45 minutes. Shane Ridge is prone to lightning strikes. There is also poor access from Cooney Reservoir north to the Yellowstone River due to terrain and vegetation. Southwesterly winds can contribute to severity of fire behavior. Risk of ignition in and immediately surrounding the community is low. Risk of ignition in more distant areas of the protection district is medium.

The volunteer department has stations in Joliet and Silesia. One staff covers both stations. The department experiences a shortage of available personnel during daytime working hours (Hoferer, 2004).



Figure 5-2. Picture of ponderosa grassland vegetation along Highway 421

### 5.3.7 Laurel Rural Fire District

Fire District Profile	
Station Address	215 W. 1st St. Laurel, MT 59044
Substations	N/A
Fire Chief	Brent Peters
Paid Positions	0
Volunteers	42
Area Serviced	1,858 Ac / 3 SqMi
Population	279
Structures	107
ISO Rating	7 within 5mi of Laurel; 10 outside 5miles
Land Ownership	~ 100% private

This district covers the extreme north end of the county and receives its protection by agreement from the City of Laurel. The department has 34 volunteers. The protection responsibility includes just over a 100 rural residences. Highway 212 carrying a large volume of traffic, and the BNSF railroad tracks pass through this protection district. The highway and railroad tracks are together responsible for a large number of fire department call outs. The district is bounded by the Clarks Fork River on the east and the Yellowstone River on the northwest.

The wildland fuels consist primarily of grasses and the terrain is relatively easy to access. Long-term drought conditions and high winds can increase the severity of wildland fire incidents in the district. Average annual precipitation in the area is 12-14 inches. Risk of ignition in this area is medium owing to the railroad and highway (Wilm, 2004).

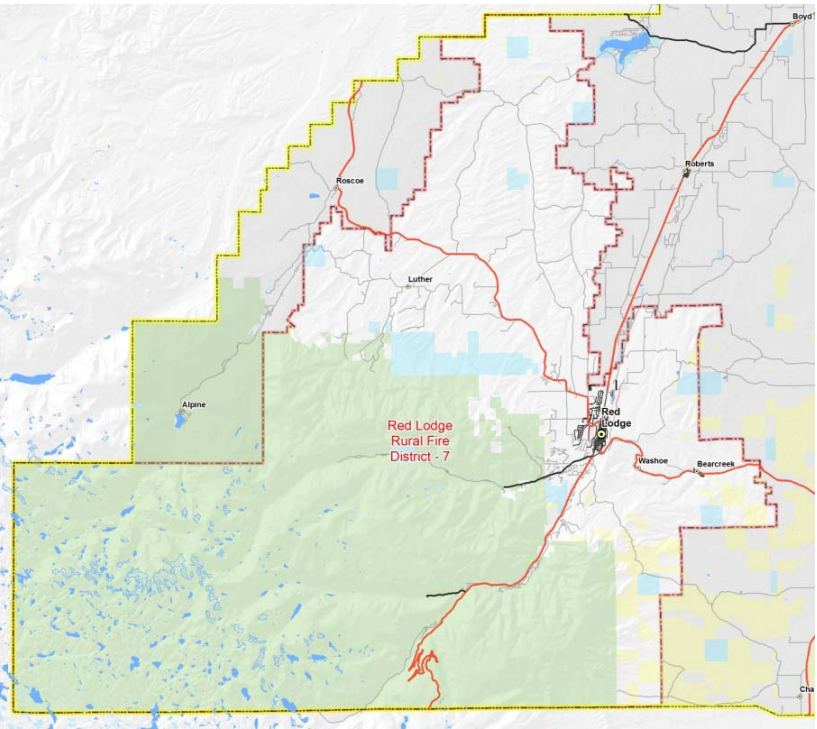
Four major residential subdivisions (Country View Estates, Rocky Point, Whitehorse, Beartooth View Estates and Krug) have been developed in this District and are approaching capacity. Some of these developments include underground 10,000 gallon dry hydrant tanks for fire protection.

Because of the proximity of the area to Billings, the amount of undeveloped land, the general suitability of the land for development, and a proposed state highway improvement, more development can be anticipated in this area in the future. Major and minor subdivisions proposed in the future will be reviewed for compliance with the county subdivision regulations. The county subdivision regulations address the ability to provide fire protection.

Overall, there have been very few fire calls or problems in this area (Peters, 2012). One of the biggest challenges involves communication and coordination between Carbon and Yellowstone Counties related to control burns. Laurel is moving toward an online burn permit system that will hopefully improve communications (Peters, 2012).

### 5.3.8 Red Lodge Rural Fire District 7

Fire District Profile	
Station Address	PO Box 318 801 N Broadway Ave Red Lodge, MT 59068
Substations	Luther and Bearcreek
Fire Chief	Tom Kuntz
Paid Positions	4 fulltime (fire & EMS), ¼ time (Fire Chief)
Volunteers	40
Area Served	386982 Ac / 605 SqMi
Population	3,535
Structures	2,890
ISO Rating	City 5, Rural <=5 mi radius from Red Lodge 8, Rural > 5 mi radius 9
Land Ownership	60% Federal, 36% Private, 3% State



With over 600 square miles, the Red Lodge Rural Fire District #7 is the largest of all districts in the County. The majority of the land is owned by the federal government (58% US Forest Service, 2% BLM). Private lands account for 36% while lands owned by the State of Montana total 3%.

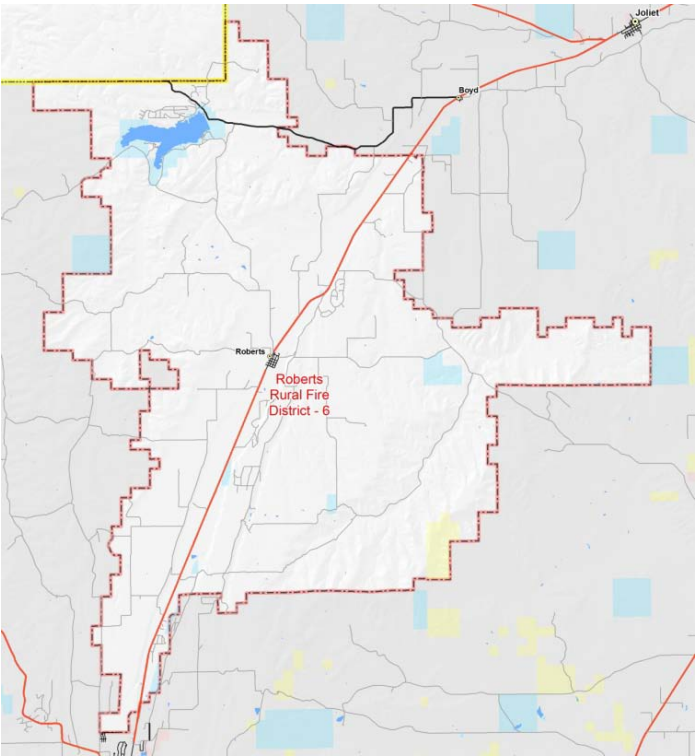
The protection responsibilities for the District include the city of Red Lodge (pop. 2,125), the incorporated town of Bearcreek (pop. 79), the unincorporated town of Luther, Red Lodge Mountain Ski Area, the Red Lodge/Carbon County airport, agricultural lands, numerous individual residences and major subdivisions south and west of Red Lodge along the Beartooth Front, and residences and subdivisions north of Red Lodge. The department currently has four fulltime employees (fire and EMS) and up to three full or half-time positions covered by grant money. A ¼ of the fire chief's time is also covered. The fire station is located at the north end of Red Lodge. Substations exist in Luther (One type 5 engine and a water tender) and Bearcreek (type 2 engine).

A number of factors increase the severity of wildland fire behavior in this area of the county. Steep south, east, and west-facing slopes and canyons with light, flammable fuels down low and dense mature lodgepole pine above provide the opportunity for high intensity fire with extreme fire behavior. The area frequently experiences strong winds. Typical summer weather patterns produce extended periods of high winds, high temperatures, low humidity, and no precipitation. Average annual precipitation in the area ranges from 18 to 30 inches.

Because of the pattern of the National Forest boundary, there is a long distance of forest frontage with fuels varying from grass to heavy timber. There are a significant number of residential assets, some worth several millions of dollars located in these wildland urban interface areas to which access can be difficult and time consuming, and for which there are no water sources located in close proximity.

### 5.3.9 Roberts Rural Fire District 6

Fire District Profile	
Station Address	PO Box 196 5 S First St Roberts, MT 59070
Substations	N/A
Fire Chief	Hunter Bell
Paid Positions	N/A
Volunteers	14
Area Served	82,442 Ac / 129 SqMi
Population	1123
Structures	723
ISO Rating	Town=7, 5 mi. from Roberts=8B, Rural=10
Land Ownership	96% Private, 2% State, 1% Federal



The Roberts Rural Fire District #6, an all-volunteer force with a fire station located in Roberts, protects the unincorporated community of Roberts and surrounding agricultural lands and rural residences. Roberts has a population of 361 and consists of residences, a small commercial district, a gas station, school, and fertilizer company. Additional developed areas and assets include Cooney State Park (recreational infrastructure and homes), the grain elevator at Fox, a gas pipeline, rural residences, agricultural lands, state sections, and BLM land (upon which the RFD assists the BLM.)

Lands within the District are almost all private (96%) with a small scattering of State (2%) and BLM lands (1%).

In general, fuels are light, fine and flashy in the district. On the east side of the district there is rocky, steep terrain along the Roberts-Bridger Road. Southeast of Roberts is the “big slide”, another steep area with broken terrain. A small amount of timber is scattered around the district. Scattered pine and sagebrush are found along Elbow Creek and at Cherry Springs. Wheat stubble is another fuel found in the district. Average annual precipitation in the area is



14 to 16 inches. Risk of ignition in the community is low. Risk of ignition in other areas of this district is medium.

Some residences in the district take 20 minutes to reach and water supply is a problem in most areas of the district. Access is a severe problem with respect to two areas within the district. The bridges to reach Western Ranch Estates I and II are inadequate to hold the fire apparatus and access must be obtained across a pasture if physically possible (Figure 5-3). An additional residential area south of Roberts on the east side of Highway 212 also has access unable to accommodate fire apparatus. At this location, due to the terrain (against the base of the east bench to the east and across Rock Creek to the west) there is no secondary means of access and the area is totally without fire protection.

The number of volunteers with the department is holding steady or increasing.



**Figure 5-3. Picture of access across Rock Creek to Western Ranch Estates Subdivision**

### **5.3.10 Unprotected Areas of County**

The southeast section of Carbon County is not currently within any rural fire district. However, Bridger RFD often responds voluntarily to fires in this area. The area covers 489 square miles and is predominantly in federal or state ownership (71%). Included in this area are the Pryor Mountains managed by the US Forest Service, The Pryor Mountain Wild Horse Range managed mostly by the BLM, and the Big Horn Canyon National Recreation Area managed by the National Park Service.

The County Commissioners are considering adding this area to an existing district or creating a new one to create uniform fire protection throughout the County. Doing so would encompass approximately 140 landowners and 32 residential structures. Several of these structures are concentrated in the Sage Creek area, a private in-holding within the Custer National Forest. A new fire district would also help protect several industrial facilities associated with oil, gas and the limestone quarry.

## 5.4. Assessment of Fuel Hazard

### 5.4.1 Vegetative Fuels

Carbon County reaches from 3,700 feet to nearly 13,000 feet in elevation. The variation produces significant diversity in vegetative cover, precipitation, topography, and land use.

The northern border of the county follows the Yellowstone River. These rough terrain breaks are difficult to access. Vegetation consists of grasses with scattered pine and brushy draws. Native vegetation is confined to the steep coulees. Moving to the south and away from the river, the topography becomes more moderate rolling hills that are more accessible, less timbered, and more likely to be in agricultural production.

The central area of the county is dominated by the Rock Creek and Clarks' Fork River Valley bottoms. Floodplain areas contain woody brush and cottonwoods. The major communities in the county are situated in these two valleys and largely insulated from catastrophic fire by surrounding agricultural lands. The grass fuels tend to be relatively sparse and short due to grazing so that fire spread would be limited unless significant winds were present. The combination of farming and stock grazing in the central portions of the county has led to a landscape that is generally low potential for wildfires.



Figure 5-4. Picture of 2002 Red Waffle Fire, Pryor Mountains

The Pryor Mountain Range comprises the eastern-most portion of the county. Elevations range from 4500 to 8800 feet above sea level. Vegetation varies with elevation and aspect but high elevation areas contain patches of dense Douglas fir and ponderosa pine with scattered pine and open meadows. Lower elevations are covered primarily with grass and sagebrush. Draws contain timber at higher elevations and brush down low. The lands are used for domestic and wild horse pasture, recreation, minerals, and oil and gas production. The residences that do exist in the area on private land are mostly along the Sage Creek drainage. The potential for wildfires in the Pryor Range is significant although the values at risk are less than in other more densely-populated areas of the county.

The Beartooth Mountain Front lies in a band circling the southwest corner of the county. This area is covered in lodgepole pine stands that are 100-120 years old. This area is ripe for a wind-driven stand-replacing fire. A fire started in this area would be expected to produce large flame lengths that could loft fire brands a great distance. Numerous factors add to the complexity of the situation. First, there are many rural subdivisions and individual homes built

against the front area, many of these without defensible space. Second, the area contains the Red Lodge Mountain Ski area (Carbon County's largest private employer.) Third, much of the area is not readily accessible, and there is only one road in and out of the West Fork drainage. Fourth, the West Fork is a steep-walled canyon creating conditions where rapid spread would be likely. Fifth, lightning activity can be high in the area. Sixth, evidence of the long-term drought is manifesting in the presence of stressed and dead trees. And, finally, there is a large amount of vehicle traffic, developed, and dispersed recreational activity during fire season. A stand-replacing fire in the West Fork of Rock Creek could have extremely disastrous consequences which could likely include loss of multiple human lives, not to mention large scale property and economic loss.

The extreme south central and south western portions of the county are comprised of higher elevation plateaus for the most part above timberline. The lands are publicly-owned and managed by the Forest Service. There are no residences in this area of the county. Fire starts in this area, however, could easily pose a threat to recreationists who happen to be in the area and down-canyon private and public assets such as residences, recreational developments, communications equipment on Grizzly Peak, and the Red Lodge Mountain ski area. The West Fork of Rock Creek provides one of three sources of water for the city or Red Lodge, and is the site of the municipal water treatment facility located in the creek bottom.

### ***Fuel Modeling***

Vegetation types in the US have been classified into fuel models to serve as input to mathematical surface fire behavior and spread models. A total of 13 models are defined and organized into four broad groups: grass, shrub, timber, and slash (Albini, 1976) (Anderson, 1982). Map 5.2 shows the distribution of these four primary groups in addition to agricultural areas, urban areas, water and areas void of fuel (snow, ice, barren). This map was produced through a series of workshops held across the nation with fire and fuels specialists to determine surface fuel model rule sets using unique combinations of existing vegetation type, cover, and height (USDI - US Geologic Survey, 2008). Figure 5-5 was used as a basis for delineating the WUI for the County as described in section 5.6.

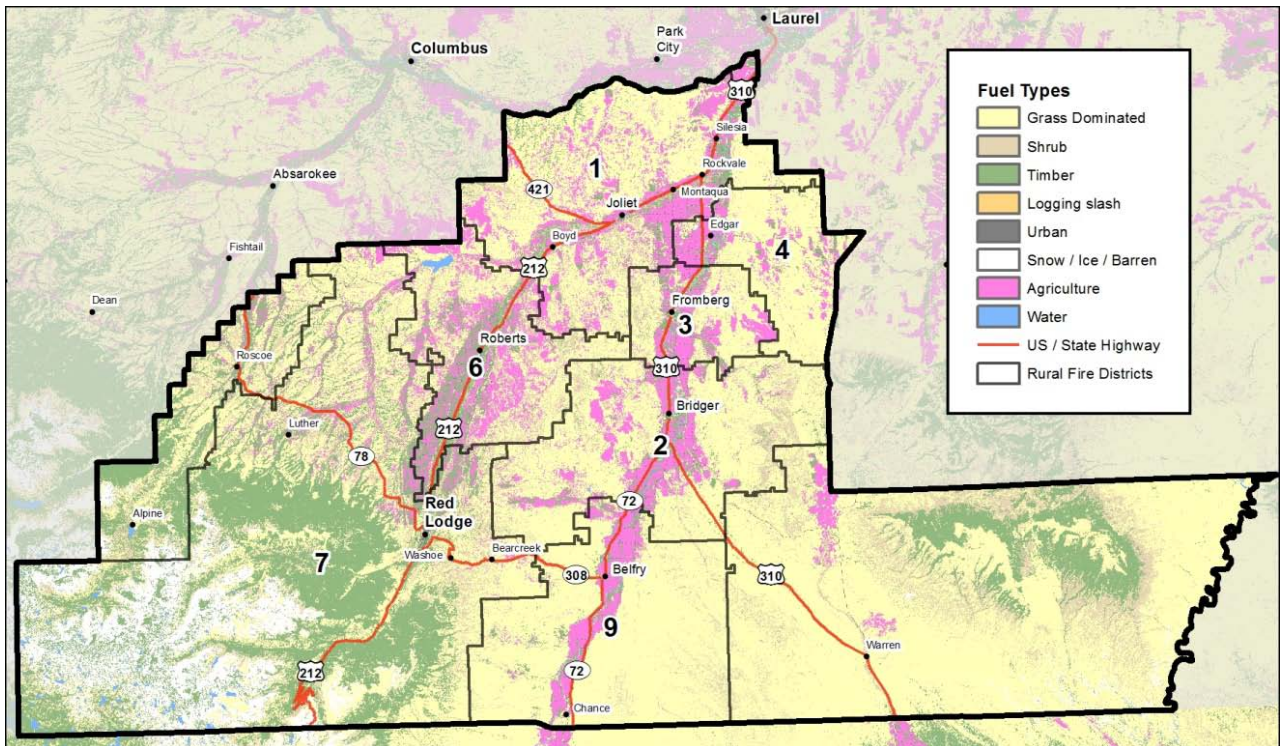


Figure 5-5. Map of Carbon County showing basic fuel models as defined by Albini, 1976 and Anderson, 1982.

#### 5.4.2 Structural Fuels

For the most part, structural fuel hazards are located within or in close proximity to the various communities and along the major drainages of Rock Creek, the Clarks Fork and East Rosebud Creek (Figure 5-6). These drainages are also major transportation corridors supporting both US and State Highways. The primary exceptions to this general rule include the structures at Red Lodge Mountain, the structures at the Timbercrest Girl Scout Camp west of Red Lodge, the structures at Westminster Spires Church Camp and Lions Camp south of Red Lodge, the Yellowstone Bighorn Research Association Camp, Cabin Home areas in the Custer National Forest and homes situated near Cooney Reservoir. Human activity at these sites whether it be recreation or commercial creates the potential for fire starts.

A large number of individual part-time and full-time residences and a number of major subdivisions south and west of Red Lodge are at significant risk from wildland fire. These properties are located along the Beartooth Front, in the West Fork of Rock Creek, and in the Main Canyon of Rock Creek.



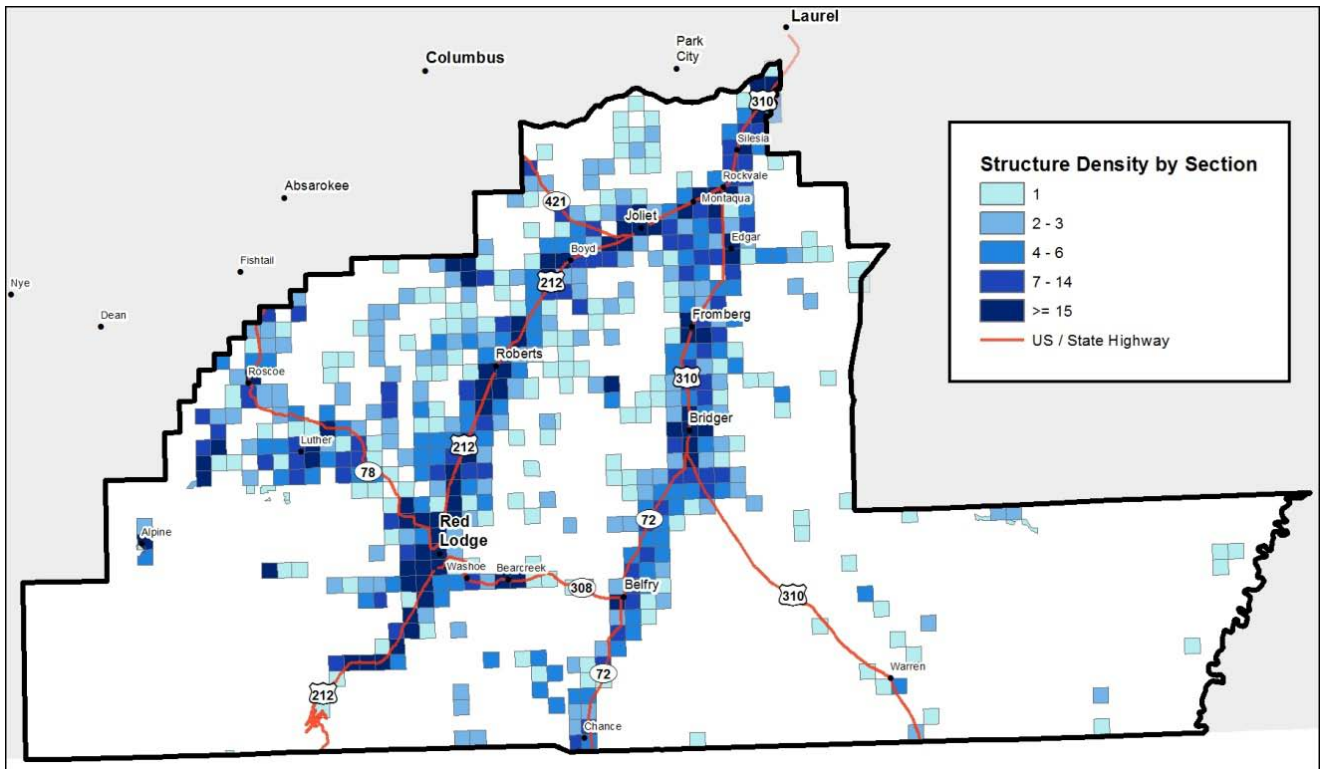


Figure 5-6. Map of Carbon County showing density of structures summarized by public land survey section (1 sqmi.)

According to the 2012 census, there are 6,441 housing units in Carbon County. For the period 2006-2010, 4.9% of these units were in multiple unit structures. The median value for owner occupied housing units for this same period was \$200,700.

The construction material used to side and roof a structure is an important factor in determining its flammability. The Montana Department of Revenue’s Computer Assisted Mass Appraisal (CAMA/ORION) database identified 6,195 residential housing units in the County (excluding mobile homes and commercial units). Of these, 37% are constructed with flammable wood siding or sheathing, while nearly 11% of homes are constructed with flammable wood shade or wood shingle construction (Table5-2).

Table 5-2. Roofing material and exterior siding on housing units in Carbon County

Roof Material	Housing Units	Percentage	Exterior Wall Finishing	Housing Units	Percentage
asphalt shingle	3843	62.0%			
metal	1155	18.6%	wood siding or sheathing	2292	37.0%
composition roll	430	6.9%	masonite	1186	19.1%
wood shake	356	5.7%	aluminum/vinyl/steel	1094	17.7%
wood shingle	309	5.0%	other	1027	16.6%
slate	37	0.6%	asbestos	207	3.3%
other	27	0.4%	shingle	171	2.8%
built up tar/gravel	17	0.3%	stucco	159	2.6%
asbestos	13	0.2%	brick	39	0.6%
tile	4	0.1%	block	13	0.2%
copper	4	0.1%	stone	7	0.1%
<b>TOTAL</b>	<b>6195</b>	<b>100.0%</b>	<b>TOTAL</b>	<b>6195</b>	<b>100.0%</b>

## 5.5. Wildland Urban Interface

This Wildland Urban Interface or WUI poses tremendous risks to life, property and infrastructure in associated communities and is one of the most dangerous and complicated situations faced by firefighters. It is estimated that as many as 38% of new home construction in the western U.S. is adjacent to or intermixed with the WUI. (U.S. Fire Administration, 2002). WUI fires pose great challenges to fire fighters primarily because access to homes and availability of water are often limited in the WUI. Fire prevention programs such as fuel reduction initiatives and home assessment in WUI areas are extremely important. Homeowners must accept a measure of responsibility and be fully aware of the risks when deciding to locate in such an environment.

### 5.5.1 WUI Definition

In 2001, the Federal Register (Vol. 66, No. 3) defined the WUI community as any place “*where humans and their development meet or intermix with wildland fuel.*” The Federal Register goes on to describe three community categories:

*Interface Community:* where structures directly abut with Wildland Fuels (3 or more structure per acre);

*Intermix Community:* where structures are scattered throughout a wildland area (1 or more structures per 40 acres);

*Occluded Community:* where structures abut an island of wildland fuels (often in a city, e.g. park or open space).

The WUI situation in Carbon County most closely resembles the Intermix Community category although most areas have a structure density less than one per 40 acres. Despite the low density, fire managers are still concerned about these areas because of public and firefighter safety and because of the unique fire suppression tactics that must be deployed.

In 2001, six communities were identified as “urban wildland interface communities within the vicinity of federal lands that are at high risk from wildfire” (United States of America, 2001). These communities were Belfry, Bridger, Edgar, Joliet, Red Lodge and Roberts. Pursuant to direction from Congress, the lists submitted by States and Tribes have been annotated by the Secretaries to identify communities around which hazardous fuel reduction treatments on Federal lands are ongoing or were planned to begin in fiscal year 2001.

### 5.5.2 Mapping the WUI

The Federal Register also provided some criteria to consider when delineating WUI:

- Fire behavior potential situations
  - Crown fire or high intensity surface fire potential
  - Potential of torching and spotting
  - No large fire history or low fire occurrence

- Values at risk situations
  - High density of structures with lack of defensible space
  - Scattered areas of high density homes less than one mile apart
- Infrastructure situations
  - Access, water availability and fire fighting capability is absent or minimal
  - Access, water availability and fire fighting capability is limited but present
  - Access, water availability and fire fighting capability is adequate and maintained

Using the criteria and “communities at risk” identified in the Federal Register, the US Forest Service (USFS) created a regional WUI map for use at broad levels of analysis and planning as shown in Figure 5-7 (USDA Forest Service, Northern Region, Fire Aviation and Air & Engineering, 2004).

In evaluating the WUI layer developed by the USFS, it was quickly determined that a more detailed map was needed for local planning and project level use. For this reason, a new County-wide WUI map was developed as part of this CWPP.

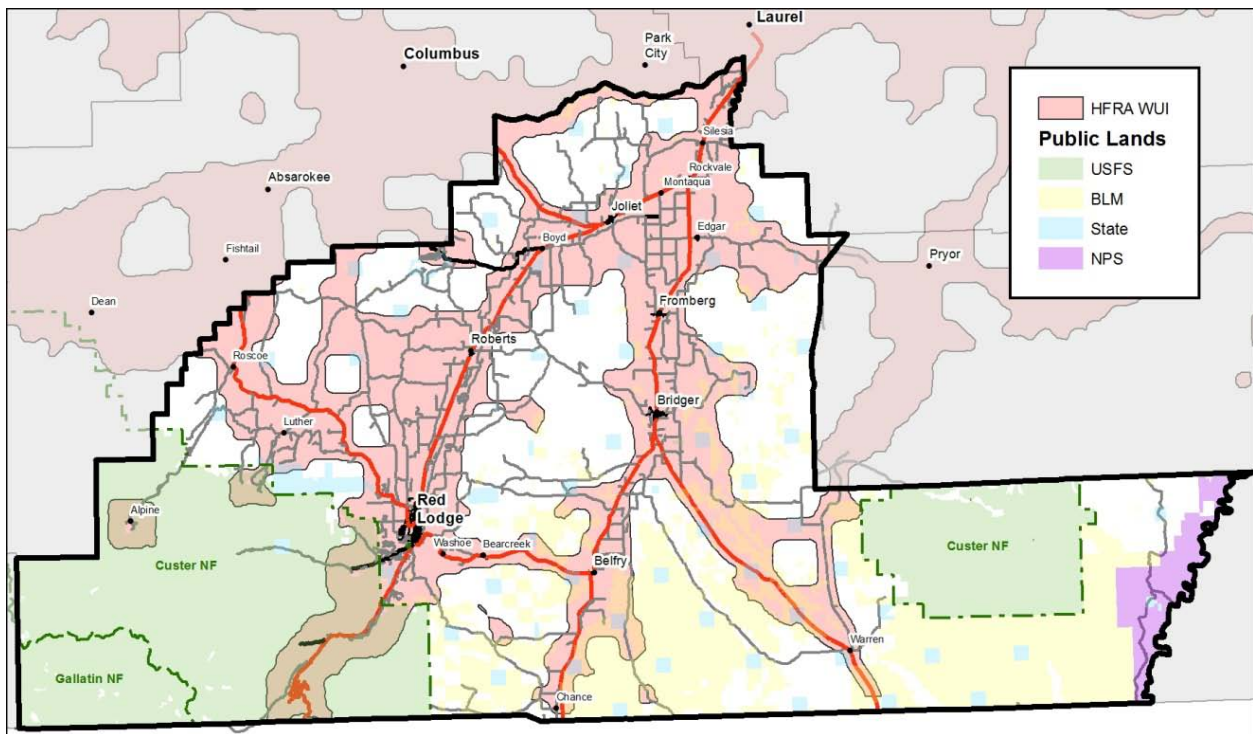


Figure 5-7. Map of Carbon County map showing a modeled version of the Healthy Forest Restoration Act (HFRA) WUI

### 5.5.3 Methodology

At the time of this writing, no accepted or standardized methodology was in place for mapping the WUI at the County level. For this reason, the County, with assistance from Red Lodge Fire Rescue, developed a simple, yet defensible method for mapping the WUI outside the National

Forest. The methodology was used to map the WUI and combined with an existing WUI layer developed by the Custer National Forest to produce a county-wide WUI map.

### ***Custer National Forest Approach to Mapping WUI***

The Custer National Forest (CNF) developed a WUI map for the forest in 2011. This approach focused mostly on human occupancy within the Forest and egress along major transportation corridors. To capture these areas within the WUI, the CNF applied a 1.5 mile buffer on the interior of the Forest boundary in combination with a 0.75 mile buffer around major roads entering the Forest (Stockwell, 2012). The resulting WUI designation can be seen in Figure 5-8.

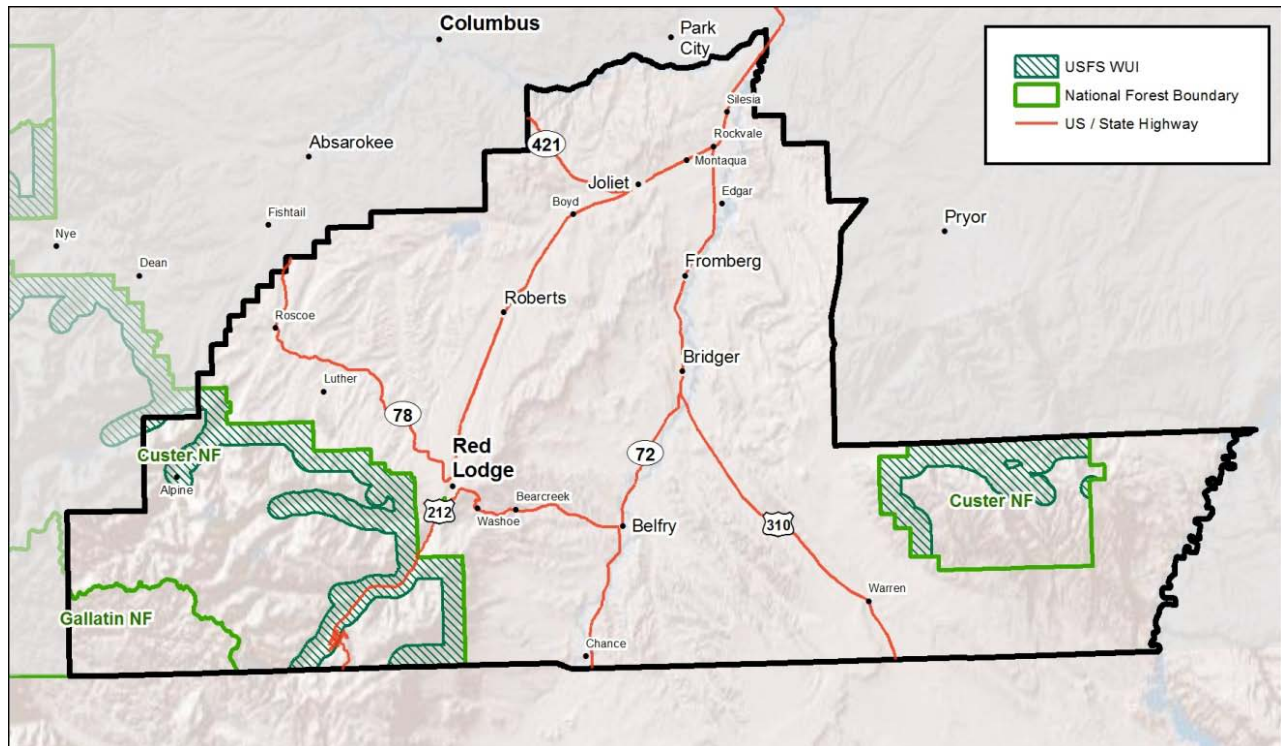


Figure 5-8. Map of Carbon County showing US Forest Service Designated WUI.

### ***County Approach to Mapping WUI***

The County approach examined moderate to heavy wildland fuels, potential for fire brands and proximity to existing structures. The specific steps in the process are outlined below.

**Step 1 - Identify and map concentrated fuels.** Research conducted by [Jack Cohen](#) and others have shown that fire is transferred to structures through two primary avenues: direct impingement (conduction) and through fire brands. When delineating the WUI for the County, these two concerns were addressed.

Direct impingement occurs when fires in heavier fuels are located close to structures. A GIS layer of Anderson fuel types (Anderson, 1982) was used to identify heavy fuels types in the County. The following four Anderson fuel types were extracted from the GIS and used when mapping wildland fuels:



### Timber (litter and understory) – Type 10

The fires burn in the surface and ground fuels with greater fire intensity than the other timber litter models. Dead-down fuels include greater quantities of 3-inch (7.6-cm) or larger limbwood resulting from over maturity or natural events that create a large load of dead material on the forest floor. Crowning out, spotting, and torching of individual trees are more frequent in this fuel situation, leading to potential fire control difficulties.



Any forest type may be considered if heavy down material is present; examples are insect- or disease-ridden stands, windthrown stands, overmature situations with deadfall, and aged light thinning or partial-cut slash.

### Hardwood litter – Type 9

Fires run through the surface litter faster than model 8 and have longer flame height. Both long-needle conifer stands and hardwood stands, especially the oak-hickory types, are typical. Fall fires in hardwoods are predictable, but high winds will actually cause higher rates of spread than predicted because of spotting caused by rolling and blowing eaves. Closed stands of long-needled pine like ponderosa, Jeffrey, and red pines, or southern pine plantations are grouped in this model. Concentrations of dead-down woody material will contribute to possible torching out of trees, spotting, and crowning.



### Closed timber litter – Type 8

Slow-burning ground fires with low flame lengths are generally the case, although the fire may encounter an occasional “jackpot” or heavy fuel concentration that can flare up. Only under severe weather conditions involving high temperatures, low humidities, and high winds do the fuels pose fire hazards. Closed canopy stands of short-needle conifers or hardwoods that have leafed out support fire in the compact litter layer. This layer is mainly needles, leaves, and occasionally twigs because little undergrowth is present in the stand. Representative conifer types are white pine, and lodgepole pine, spruce, fir, and larch.



Timber (grass and understory) – Type 2

Fire spread is primarily through the fine herbaceous fuels, either curing or dead. These are surface fires where the herbaceous material, in addition to litter and dead/down stemwood from the open shrub or timber overstory, contribute to the fire intensity. Open shrub lands and pine stands that cover one-third to two-thirds of the area may generally fit this model; such stands may include clumps of fuels that generate higher intensities and that may produce firebrands. Some pinyon-juniper may be in this model.



Because the Anderson fuel types were originally mapped using satellite-based, Thematic Mapper imagery and formatted as a raster GIS layer, the conversion to vector-based polygons was necessary to group distinct concentrations of these fuels and project fire brands (see Step 2). Polygons were digitized using a “heads-up”, on-screen approach, in combination with ancillary GIS layers and local field knowledge. Ancillary GIS layers included LandFire Fuel loading model (USDI - US Geologic Survey, 2008), Gap Analysis land cover and 2011 National Agriculture Imagery Program (NAIP).

**Step 2. Identify and map fire brand zones.** Several sources recommend a 1.5 mile buffer from the fuel load which is an estimate of how far an average fire brand can travel through air (108th Congress of the United States of America, 2003) (California Fire Alliance, 2001) (Stewart, 2007). While fuels within the “fire brand” area may be limited, it only takes one well placed fire brand to ignite a structure. Heavier fuels necessitated the full 1.5 mile buffer while less dense or scattered fuels required less of a fire brand distance (Table 5-3).

**Table 5-3. Fire brand buffer distances for the Anderson fuel types used in the Carbon County WUI map.**

<b>Anderson Fuel Type</b>	<b>Buffer Distance</b>
Timber (litter and understory), Closed timber litter, Hardwood litter	1.5 Miles
Timber (grass and understory) where fuel was correctly classified as Ponderosa Pine/grass or Juniper woodland/grass	1.0 Miles
Timber (grass and understory) where fuel was incorrectly classified as Timber/grass. Ancillary sources and local knowledge confirmed these areas as dense sagebrush steppe.	0.5 Miles

Figure 5-9 shows the four Anderson fuel types, the digitized fuel boundaries and the variable buffers around these boundaries based on the buffer distances defined in Table 5-3.



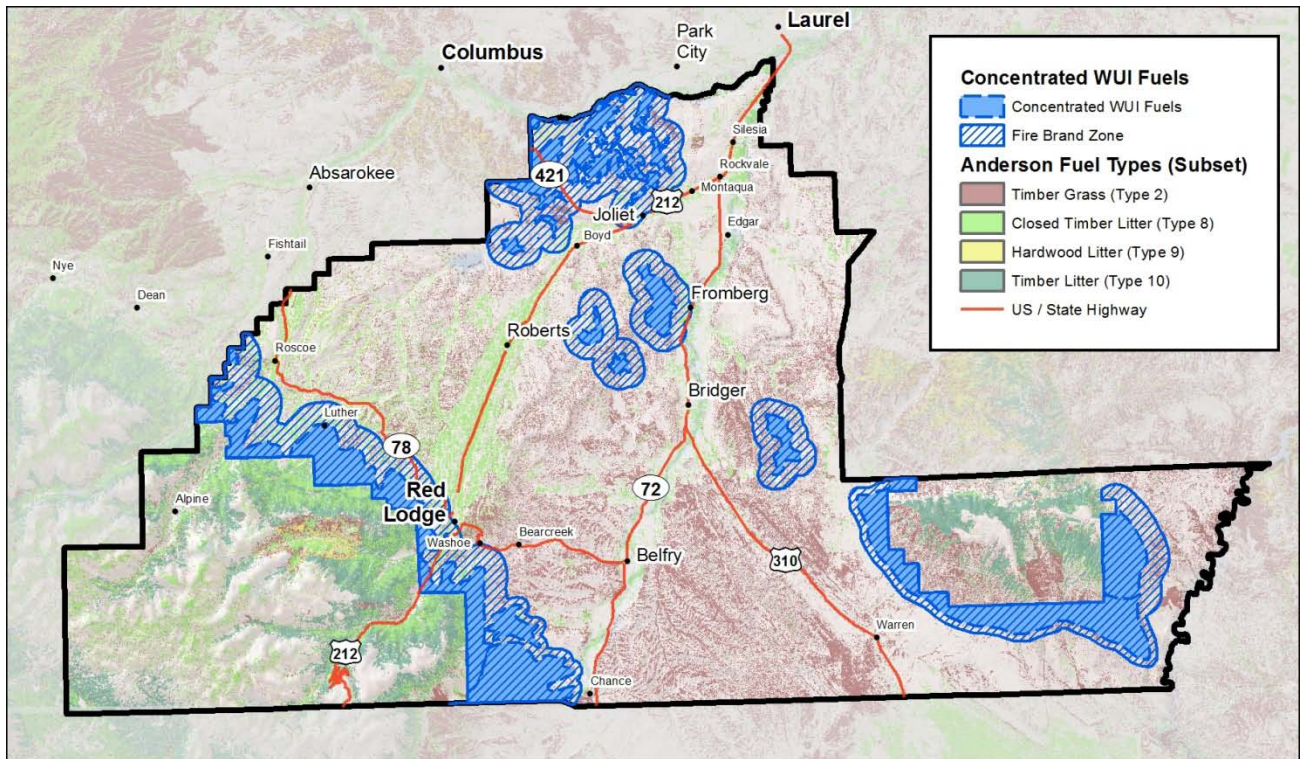


Figure 5-9. Map of Carbon County showing a subset of Anderson fuel types, digitized boundaries of concentrated fuels and fire-brand buffers.

**Step 3 - Identify and map human development concentrations.** As defined in the Montana annotated code, the WUI is the “line, area or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.”

Given this definition, the next step in the creation of the WUI map was to identify concentrations of human development in the County. Addressed structures were previously mapped by the County (Carbon County Disaster Emergency Services (DES), 2012) and was used as the base layer for this analysis. Specifically, the GIS created a structure density map based on a 0.5 mile radius for every location in the County. The result was a map that could be classified into three categories of human development: 1-5 structures/sqmi., 5-25 structures/sqmi. and >25 structures/sqmi. Figure 5-10 shows the density of structures throughout the County using these categories.

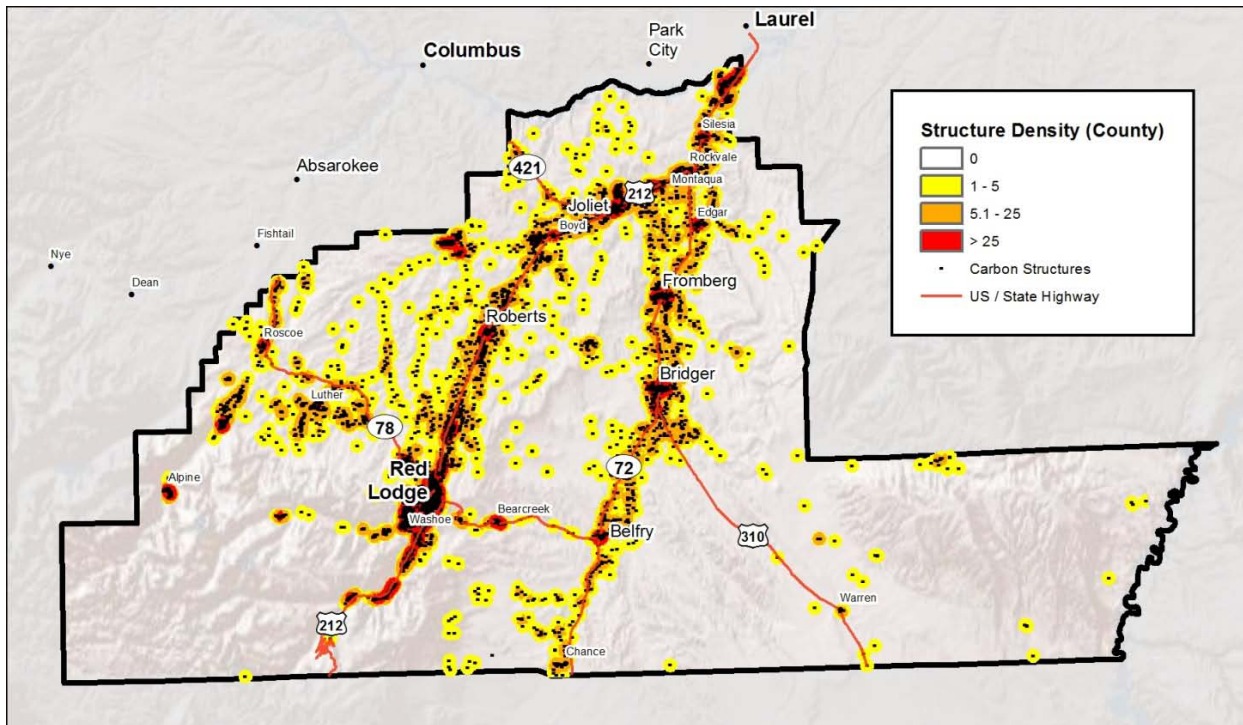


Figure 5-10. Map of Carbon County showing structure density.

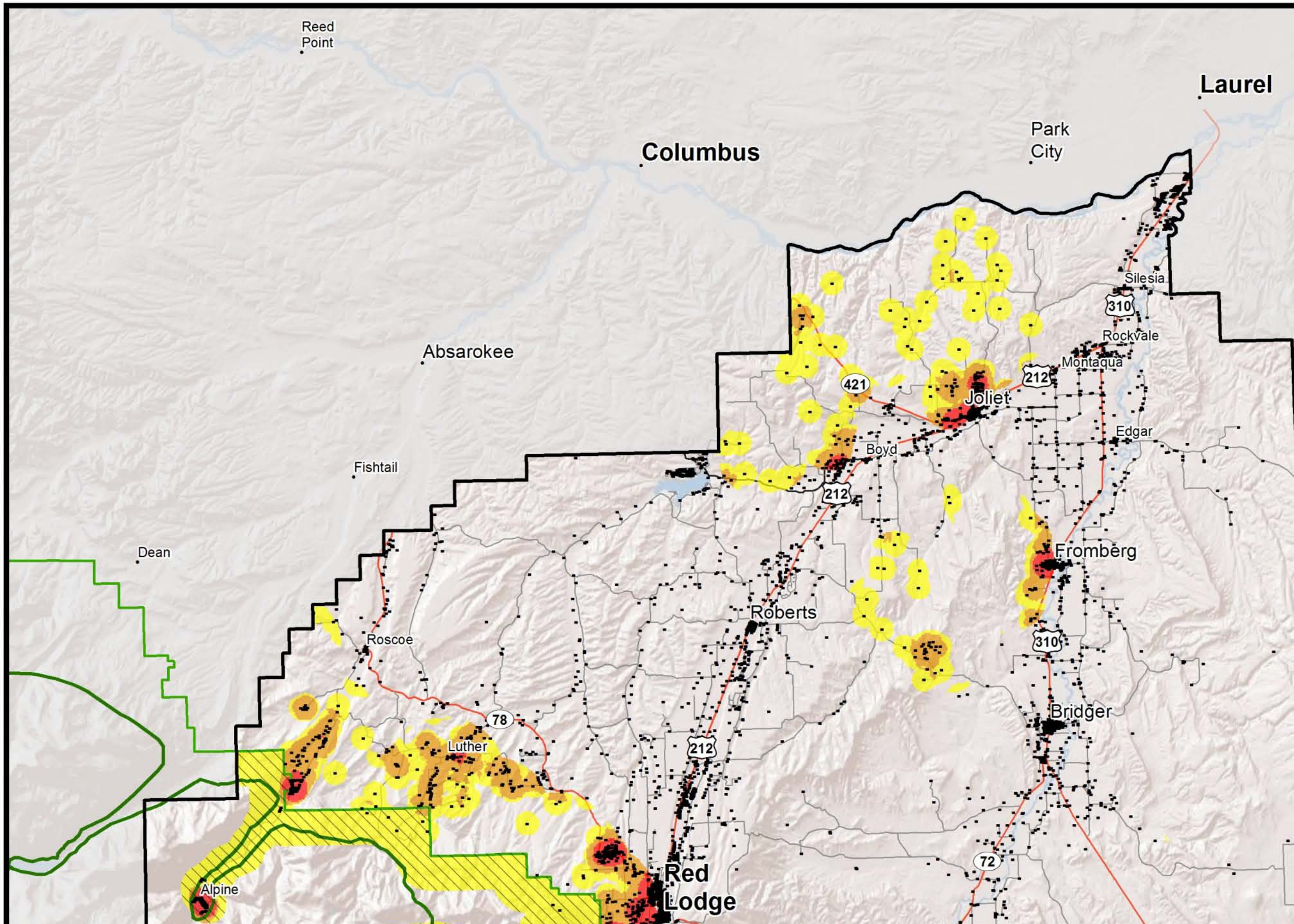
**Step 4 - Combine County and USFS WUI models.** The final County WUI map, Figure 5-11, was developed by combining the wildland fuels map (with fire brand buffers), the structure density map and the existing WUI map developed by the US Forest Service. WUI categories of High, Medium and Low portrayed on the map represent the same categories used for structure density; 1-5 structures/sqmi. (Low), 5-25 structures/sqmi. (Medium) and >25 structures/sqmi. (High).

This methodology resulted in only 268 square miles (13%) of the County being classified as WUI. However, 2,552 structures (37%) were located in the WUI. Sixty-six residential subdivisions are completely within or intersect the WUI (Table 5-4).

Table 5-4. Residential subdivisions within the Wildland Urban Interface.

400 Ranch	Grand View North	Mountainbrook	Rocky Fork Acres
Aspen Hollow	Grand View South	Nordic Estates	Rolling Hills
Aspen Ridge Ranch	Grill	North Twenty Estates	Rosebud Ranch
Beartooth Business Park	Grizzly Peak	Owen	Salo Homesites
Beartooth Mountain Estates	Harnish Meadows	Palisades Basin Ranches	Sandhill Springs
Beartrap Estates	Kane	Palisades Properties	Sheep Mountain
Berg N Dahl	Lamb Estates	Point of Rocks	Spires
Black Butte Ranch	Lazy D Ranch	Ponderosa Estates	Sun Ridge
Canyon Ranches	Lazy SL Ranches	Raymond	Sundance
Canyon View	Little Willow Creek Prop.	Remington Ranch	Tipi Village
Cedar Creek	Meadowood	Remington Ranch West	Wadsworth Cabin Sites
Cottonwood Coulee	Meeteetse Meadows	Rimrock View	Wapiti
Creek Hill	Mountain Meadows	RLCCE	Waples
Creekside Estates	Mountain Shadow	RnR Elk Resort	Waples/Red Lodge Estates
Eagle Point	Mountain View	Rock Creek Estates	West Fork Estates
Gramling Orchard	Mountain Waters	Rock Creek Mine	Wilderness Estates







In addition to these subdivisions there are five of summer home areas, three recreational camps, and one research facility located within the forest boundary, permitted by the US Forest Service.

The summer home areas in the West Fork drainage include 21 cabins in Camp Senia, 3 cabins in Dutch Creek and 4 other scattered cabins in the West Fork drainage. The permitted summer home areas in the Main Canyon include Spring Creek with 22 cabins, Corral Creek with 9 cabins, Sheep and Snow Creek with 30 cabins.

Recreational camps include the Timbercrest Girl Scout Camp, Westminster Spires Camp and the Lions Beartooth Mountain Youth Camp. Timbercrest is located in the West Fork drainage, with an estimated 34 structures, mostly small cabins. The camp is located in the lower Dutch Creek drainage along West Fork Road. Westminster Spires Camp is located in the Main Fork and has 13 structures. The Lions Camp is located near the confluence of the Lake/Main Fork of Rock Creek and has approximately 22 structures.

The Yellowstone Bighorn Research Association (YBRA) camp is situated high up on the east slope of the Main Canyon of Rock Creek approximately five miles south of Red Lodge. The camp has a large number of wooden structures, is located in the timber, and is difficult to access. The camp is occupied around the clock during the fire season with staff and students. One steep dead-end road serves the camp. The staff is active in practicing fire prevention and response and has some water for fire protection stored on site. Fuels reduction around the YBRA facility was completed in 2011 by Red Lodge Fire Rescue with funding from the BLM.

Recreation Staff Officer for the Beartooth District, Jeff Gildehaus, estimates that approximately 30% of these structures have wooden shake roofs. The remaining 70% have roofs of either metal or composition shingle. The structures themselves are all built of wood. Some also have stone features such as chimneys. In all but a few cases, defensible space has not been created around these structures.

In addition to the summer homes and the homes located within subdivisions, there are a number of individual homes located in the Main Canyon and near the base of the West Fork of Rock Creek. In the Main Canyon most of the homes are situated either along the creek bottom or on the first terrace above the creek.



**Figure 5-12. Picture of Home situated in the bottom of the West Fork of Rock Creek drainage.**

Several homes in the Main Canyon, however, are located on the steep side slopes of the canyon. Access is difficult due to road grades and fuels are a mixture of grass and scattered pine. Upslope from these homes are heavier fuels and even steeper terrain with no vehicle access. There are no water sources at these homes for fire protection other than the domestic wells which in some cases yield very small amounts of water.

Other subdivisions located just outside of the WUI, but still having wildland fire concerns is Sam's Retreat and Mountain View subdivisions on the north side of Cooney Reservoir. Combined, these subdivisions have 62 homes/cabins/trailers present. Access to the subdivisions is limited by steep, narrow roads and flashy fuels surround the subdivisions.

## **5.6. Assessment of Risk**

### **5.6.1 Ignition Profile**

Nine ignition sources for wildland fire were identified by the members of the Carbon County Fire Council on October 21, 2004. These sources include: lightning; highways and roads; railroads; power lines; equipment and industrial activity, recreational activity, rural residents, escaped controlled burns, and other sources. Fire Council members mapped common ignition sources and locations based upon their experience during the Fire Council meeting held on January 20, 2005. Map locations were identified based upon the criteria of four or more starts at or near the location over a 10-year period.

In general, relatively higher numbers of lightning starts occurred in the Pryor Mountains and the higher mountainous country south and west of Red Lodge. Human-caused ignitions occurred along roadways and near rural residences. Power line ignitions occurred where the lines were exposed to high winds, for instance between Red Lodge and Belfry. Railroad



ignitions occurred along the tracks in the northern and eastern portions of the county. The fire chiefs in the north, central, and eastern areas of the county reported that they respond to a significant number of escaped fires from land owners burning ditches, borrow pits, and farmland stubble. According to law enforcement, the majority of fire starts on public lands in the county are human rather than lightning caused. And although most of the past human caused fires have been accidental, this may not always be the case in the future. It is possible that the percent of arson ignitions in the future may grow.

Risks of accidental human-caused ignition are highest along roads and highways, power lines, railroad tracks, and around developed recreation sites.

Risks of human-caused ignition are moderate in areas of dispersed recreation and rural residences. Risks of ignition to wild lands are lowest within the developed community areas, on agricultural lands, and in the river valley bottoms. Risk of ignition

from lightning is highest at the topographical high points,

including the Beartooth Plateau and mountain front, the Pryor Range, and on Shane Ridge in the northwest area of the county.



Figure 5-13. Picture of agricultural burning north of Silesia, March 2005

### 5.6.2 Behavior and Development Trends

Behavior and development issues related to fire protection vary across the county. Growth and development are occurring in the north end of the county, along the Rock Creek valley, in the Red Lodge area, and along the mountain front. The challenges presented by development differ depending on the fuel types, terrain, access, and response times.

Generally, the development of most concern in the county from the standpoint of fire protection is occurring south and west of Red Lodge along the wildland urban interface area against the boundary of the National Forest. Previously subdivided lots continue to be built upon and new subdivisions continue to be proposed at a steady rate, creating up to as many as several hundred new lots per year. Although the number of new developments fluctuates somewhat from year to year, nothing indicates this trend will change in the near term and it may even become more pronounced as the baby boom demographic continues to look for retirement property in areas with access to recreational opportunities, wildlife, and scenery. Even without additional subdivision, a large number of lots are already available to be built upon.

New rural residences are typically wood frame construction or in the interface areas, log construction. Many of the subdivisions' covenants require rustic construction materials that fit

in visually with the natural landscape. Fortunately, most new homes in interface areas are being constructed with metal or composition shingle, rather wooden shake roofs.



Figure 5-14. Picture of typical new construction in wildland area - log with metal roof.

“There are a significant number of second home owners in the areas around Red Lodge. These less-than-fulltime residents are less interested in protecting their properties than fulltime residents. This can put adjacent properties at increased risk” (Kuntz, 2004). In the Roscoe

area “people are choosing to build in

the interface area. This makes fire protection more complicated because access is difficult and fuels are heavy” (Noe, 2004). In the Roberts area, “people are building in more areas without direct highway access, in more rural areas” (Joki, 2004) This can lengthen response times and present access challenges.

The good news if there is any is that when a fire does occur, property owners respond. “When a fire happens in someone’s “backyard” there is generally a flurry of activity related to creating defensible space. Examples of this were homeowners’ activities in the 400 Ranch and Main Canyon of Rock Creek following the Willie Fire in 2000” (Stockwell, 2012). After the Cow Creek Fire in the north end of the county, a number of individuals replaced their wood shake roofs with metal roofs (Hoferer, 2004). Unfortunately actions to manage fuels are all too often relatively short-lived and property owners do less well at managing the fuel situation over the longer term than they do immediately following an incident.

Property owners in the Tipi Village subdivision west of Red Lodge are replacing roofs as well. Many of the homes in the subdivision are approximately 25 years old. As the original shake roofs reach the end of their useful life, materials chosen for replacement have been exclusively metal and composition shingle. This trend may be related to the proximity of the Willie Fire in 2000 since residents of the Tipi Village Subdivision were evacuated during that fire.

One disturbing trend based upon the experience of reviewing many proposed major subdivisions and their subsequent development was noted by Chief Kuntz. There is a trend not to build out subdivisions in the way they were approved. There are no checks to ensure the development occurs as per the requirements of the county in their approval. There is no enforceable code for such things as maintenance of roads and fire protection systems. In some cases, the problems associated with lack of proper construction and maintenance of

roads and fire protection systems may not become evident until the call comes in and responders are forced to do their best in a less than desirable situation. Losses could exceed those that would have occurred had the systems and roads been constructed to standard and properly maintained. In the worst case, firefighters' and residents' lives could be put at additional risk (Kuntz, 2004).

Highway 310 which passes through the Clarks Fork Valley carries a large amount of semi-truck traffic. The volume appears to be increasing and there are semis hauling a great deal of potentially hazardous material through the county (Maddox, 2004). This can increase the potential of a hazardous material spill and/or ignition of a wildland fire along the highway.

Although not a trend in human behavior or development, the trend in climatic conditions in recent years has major implications for wildland fire severity. Carbon County has been experiencing a severe, long-lasting drought. The USDA has declared the county a drought disaster for the past several years. Many areas of the county, particularly the south and southeastern portions, receive only small amounts of precipitation even in average years. Lower levels of precipitation affect fuel moisture as well. Mortality due to the stress of continued drought is occurring in a number of timbered areas of the county.

Some, but not all of the departments in the county are challenged to maintain an adequate volunteer staff. Serving as a volunteer on a department requires a time commitment not only to respond to calls, but also to maintain currency in training. The departments have had differing experiences in utilizing individuals under the age of 21, some have been satisfactory and some unsatisfactory. The departments in the county have different policies on lower age limits as a result of their experiences. Many people in the county work more than one job, or work at jobs such as agriculture that have high demands on their time during certain seasons. Time spent with the fire department may be time away from family. In some areas of the county, Red Lodge for example, the economics have produced a demographic with a relatively small number of young families, a pool from which volunteers could logically come. In other areas of the county, the population is more aged and unable to serve.

## **5.7. Unique Wildfire Severity Factors**

Increased probability of ignitions in the county occurs as a result of both natural and person-caused situations. Natural ignitions have and continue to occur due to topographical features such as ridges, high elevation plateaus, and high points.

Many areas of the county are at risk from unintended person-caused ignitions. The situation is slightly different between the eastern and western halves of the county. The public lands in the Pryor Mountains experience grazing management and recreation activity year-round, much of the activity being associated with the use of motorized vehicles. Along the Clarks Fork Valley bottom, the railroad is responsible for numerous grass fires during the spring, summer, and fall. Travelers on Highway 310 are also responsible for fire starts both from vehicle accidents and discarding burning debris. Many landowners in the Clarks Fork and lower Rock

Creek valleys burn off stubble and grasses in their fields and ditches in the spring. These landowner actions often result in escaped fires to which the departments must respond.

In the western half of the county, Highway 212 follows the Rock Creek drainage. Travelers on the highway start fires as a result of vehicle accidents and the discard of burning materials. The public lands south and west of Red Lodge receive heavy recreational use during the driest times of the year. Some of these uses include hiking, camping, wildlife viewing, hunting and fishing, fire wood collection, and recreational vehicle operation. Vehicles can start fires along county and forest roads, and each year numbers of campfires are left unattended, some serving as ignition sources. In addition, there are 27 recreational residences in the West Fork drainage, and 69 recreational residences in the Main Canyon of Rock Creek that are permitted by the Custer National Forest within the forest boundary. These cabins are used primarily during the summer months when fire danger is highest. Three organizational camps are permitted within the forest boundary, Timbercrest in the West Fork, and Westminster Spires and the Lion's Camp in the Main Canyon of Rock Creek south of Red Lodge. The YBRA Camp is also located in the Main Canyon and is used during the fire season.

Extreme fire behavior can occur in the county due to:

- 1) prolonged drought conditions causing low fuel moisture, stressed vegetation, and mortality in some timbered areas such as Shane Ridge, the West Fork of Rock Creek, and the Main Canyon of Rock Creek,
- 2) high winds, and resulting blow down,
- 3) heavy, mature fuels, especially in the West Fork and Main Canyons of Rock Creek,
- 4) Terrain breaks in the center and northern parts of the county, and steep terrain and canyons in the Pryor and Beartooth Mountains.

#### **5.7.1 Blowdown and Insects**

In mid-November 2007, severely high winds resulted in extensive blowdown throughout lodgepole pine and mixed-species forest stands on the Beartooth Ranger District. Disease and insect specialists from the USFS inspected several windthrown stands on the district in May 2008. Their findings revealed that "the greatest threat of bark beetle outbreaks appear to be from Douglas-fir and spruce beetles. While most of the downed trees appear to be lodgepole pine, and some of it may be infested by engraver beetles, I believe the likelihood of an engraver beetle "outbreak" is not great." They also found that "threats of mountain pine beetles infesting downed lodgepole pine is slight. Only rarely do mountain pine beetles attack downed trees. The possibility of engraver beetles building to outbreak populations in ponderosa pine, while not non-existent, does not appear to be extreme" (Greg DeNitto, 2008).

## **5.8. Values to be Protected**

### **5.8.1 Assessment of Economic Values**

Agriculture in Carbon County consists of both farming and ranching. Ranching assets at risk from wildfire include livestock (cattle, sheep, and horses), forage, and range improvements. The USDA collects farm statistics every five years. The most recent year for which these statistics are available for Carbon County is 2007. According to the USDA National Agricultural Statistics Service, there were 56,859 cattle and calves, 6,011 sheep and lambs, 3,191 horses and ponies, and 49 bison in Carbon County in 2007

Farm assets that could be at risk include crops, storage facilities such as grain and bean elevators, equipment and machinery. Because much of the cropland in the county is irrigated, especially in the Clarks Fork Valley, risk of loss from wildland fire to farms is limited. The “important farmland” as designated by the U.S. Department of Agriculture follows the bottom of the Clarks Fork Valley and corresponds to areas of low risk for wildland fire because of vegetation and terrain factors (US Department of Agriculture, 1976).

Commodities produced in the county are primarily the result of agricultural activity. In addition to agriculture, however, a small amount of commercial forest products such as post and poles, and firewood are harvested. There are no lumber mills in the county. Oil and gas is produced and stored in the Elk Basin Field in the southeastern portion of the county. Wildland fire in the area of oil production has the potential to interrupt production for short periods of time.

Critical community infrastructure was identified by the plan steering committee. The values for the critical infrastructure are provided in Appendix C of the PDM plan. With the exception of the West Fork of Rock which serves to meet a portion of the municipal water needs for the city of Red Lodge, other critical community infrastructure is not at risk from wildland fire.

Tourism is an important sector in the economy of Carbon County. Both residents and visitors enjoy outdoor activities year-round in the county. Tourism occurs primarily in the summer season when Highway 212 between Red Lodge and Yellowstone Park is open, and during the winter months when Red Lodge Mountain is open for ski traffic. Summer tourist activities in the county include wildlife viewing, angling, hiking, cycling, floating, rock climbing, and horseback riding. In the fall, bear, big game, and bird hunting bring people to the county. And in winter, downhill and cross-country skiing occur in the Red Lodge area.

### **5.8.2 Assessment of Ecological Values**

As a result of the ranges in elevation, aspect, temperature, precipitation, vegetation, and terrain in the county, Carbon County provides diverse wildlife habitat. The county is home to a variety of big game species such as white-tailed and mule deer, elk, moose, big horn sheep, antelope, and mountain goats. Other featured species include black bears and mountain lions. In addition, numerous small mammals, fur-bearers, game birds, and migratory and non-migratory songbirds reside in the county. Grizzly bears and grey wolves, both listed under the

Endangered Species Act can be found in the southwestern areas of the county in the mountains.

Air quality in the county is generally excellent due to natural dispersal and lack of polluting activity. Short-duration impacts to air quality include smoke from wildland fire in the summer and fall, smoke from ditch burning in the spring, dust from travel on unpaved roads, and dust from agricultural practices primarily in the spring. Yellowstone National Park located to the south and west of the county has been designated a Class One airshed.

Soils in the county consist of five major associations. According to the Carbon County General Resource Assessment (NRCS, 1999) the most common soil types were formed in the sedimentary uplands and occur throughout the central part of the county from the Yellowstone River to the Wyoming line and in the southeast corner of the county. The other soil associations include deep, well-drained soils in mixed alluvium; well-drained sand and gravel soils along the Clarks Fork floodplain, mixed alluvium and glacial outwash soils along the mountain front, and limestone bedrock in the Pryor Mountains and foothills. Soils in the Clarks Fork Valley are highly productive for agricultural purposes.

According to the County's Growth Policy (Carbon County Montana, 2001), just over 390,000 acres of the county are covered by forests. Most of this acreage, 368,000 acres is in evergreen forest, deciduous species cover only 9,000 acres, and mixed forest, covers the remaining 16,000 acres.

### **5.8.3 Assessment of Social Values**

The majority of lands located in Carbon County are undeveloped (Carbon County Montana, 2001). Development covers only 1200 acres of the county. Approximately 55% of the population resides outside of the five incorporated communities. Most of these residences are found either along the valley bottoms or along the mountain front in the western portion of the county. As with many other areas in Montana and the west, people have chosen to settle in areas immediately adjacent to wildlands for reasons of solitude, aesthetics, and nearness to nature and wildlife.

Individuals who live in and visit Carbon County do so for a number of reasons. These include having grown up in the county or having family here, productive agricultural lands, outdoor recreation opportunities, wildlife viewing opportunities, desiring a scenic view, desiring a healthful environment, wanting to live in an area with a low crime rate, and/or finding land and property more affordable than in other locations.

To some extent the reasons for residing in the county vary by area of the county. The residents in the north end of the county are frequently commuters to jobs in Billings, many in the Clarks Fork Valley are longer-term residents engaged in agriculture, and those along the mountain front tend to be more recent residents concerned with wildlife, aesthetic values, and tourism. Many home owners along the mountain front in and to the west of Red Lodge are second home owners and seasonal residents who leave the county during the winter months.



### 5.8.4 Potential Loss Estimate

The 2005 CWPP for Carbon County included a catastrophic wildland fire scenario for the purpose of estimating potential losses. The loss estimate was developed with input from the Forest Service and included a wind-driven fire in the lodgepole stands in the West Fork of Rock Creek. The scenario burned 15,000 acres on both the National Forest and adjacent private lands. Twenty seven cabins, 40 residences on private lands and the Timbercrest Scout Camp were lost in the scenario. Direct costs for this fire scenario were estimated at \$44 million with several million more in indirect costs (e.g., loss of recreation users and resulting loss of commerce for area businesses; loss of commercial opportunity for firewood and post and pole products). Indirect costs related to negative impacts to the municipal water watershed, fisheries and habitat were also considered.

Ironically, the Cascade fire of 2008 mimicked this scenario in terms of location and size of the fire (Figure 5-15), but not in terms of the number of structures lost. The fire originated near Camp Senia and burned up the drainage about two miles and down to Basin Campground. The burn area total was 10,173 acres. Two cabins at Senia were lost and several recreational amenities were lost or damaged by the fire. \$11.4 million was spent to suppress the fire (Stockwell, 2012). Again, this figure only included direct suppression cost and did not include expenses related to rehabilitation or any indirect costs associated with the fire.

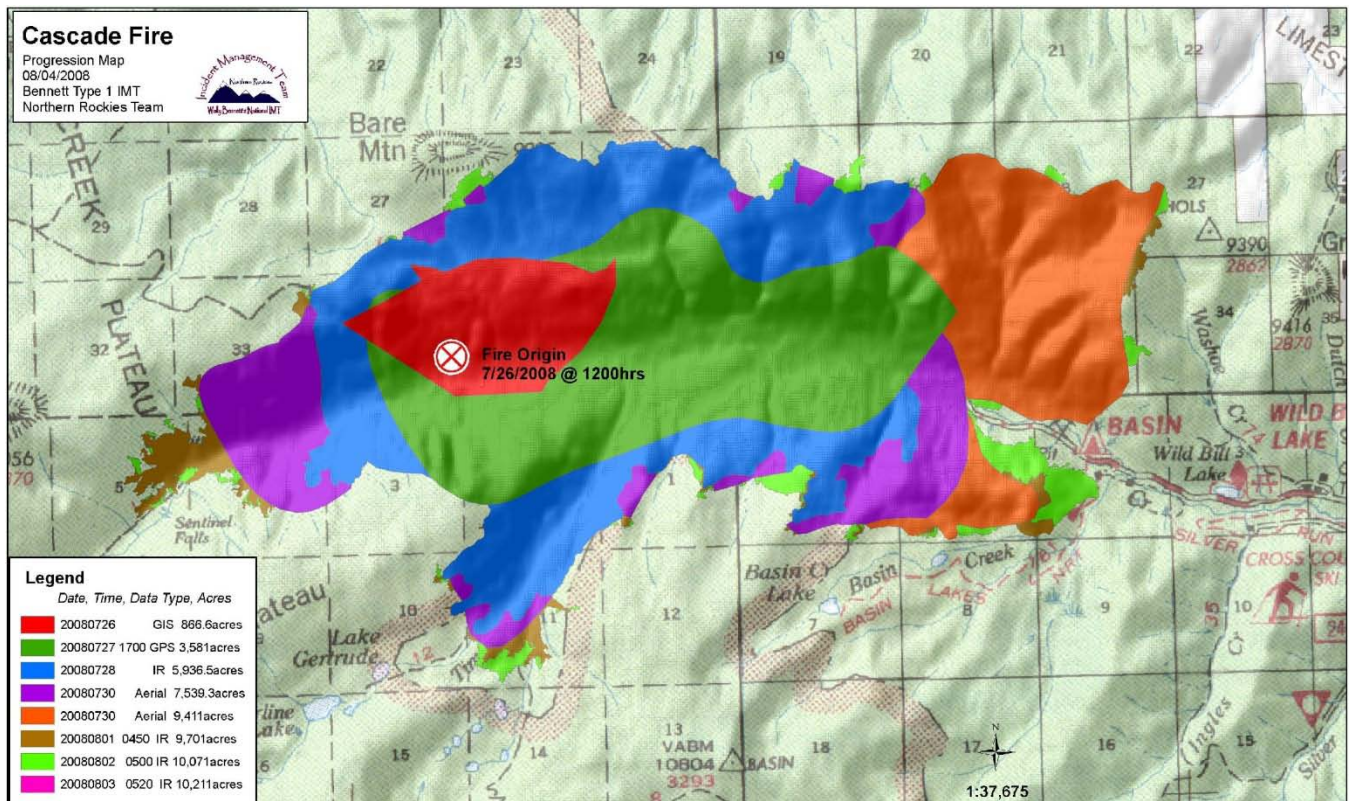


Figure 5-15. Fire progression map of the 2008 Cascade Fire in the West Fork Drainage near Red Lodge.



## 5.9. Assessment of Fire Protection Preparedness and Capability

Each Department Chief and Fire Management Officer was asked to assess their departments with respect to ability to respond to grass and timber fires (Table 5-5). Most of the departments in the county are able to respond competently and safely to both types of wildland fires meaning they have had training and experience in suppressing these wildland fires.

Maintaining adequate numbers of volunteers was an issue for several, but not all of the departments. Some departments are short-staffed during work-day hours when volunteers are working at out-of-area jobs and unavailable.

Insurance premiums are based on a rating system established by the Insurance Services Office (ISO.) The ISO considers the water system and fire protection capability of a community when issuing a rating. The rating system contains ten protection classifications. Class One is the best rating a community can receive, Class Ten is the lowest, meaning the ISO recognizes little if any ability to provide fire protection. The ratings in Carbon County range from 5 in Bridger, Roberts, and Red Lodge, to 10 in other locations. Rural areas are less well protected than communities.

### 5.9.1 Community Preparedness

**Table 5-5. Fire protection response capability of Rural Fire Districts in Carbon County.**

Department	Number of Volunteers	Structural ISO Rating	Ability to Respond to Grass Fires *	Ability to respond to Timber Fires *
Joliet RFD 1	20	9	4	4
Bridger RFD 2	25	4 or 5	1	3
Fromberg RFD 3	10	9	2	2
Edgar RFD 4	12	9	1	2
Absarokee RFD 5	19	6 City 10 Rural	4	4
Roberts RFD 6	11	7 Town 8b Rural (>5 mi)	1	4
Red Lodge RFD 7	40	5 City 8 Rural (<5 mi) 9 Rural (>5 mi)	1	3
Laurel RFD	42	7 Rural (<5 mil) 10 Rural (>5 mi)	1	5
Belfry RFD 9	13	6	1	4-5

\* Ratings for ability to respond to grass and timber fires were based upon a scale of 1-10 with 1 being very able to respond, and 10 being unable.

Carbon County has been successful in obtaining grant funds in past years and continues to pursue them as they are available. Rural Fire Assistance (RFA) and Volunteer Fire Assistance (VFA) grants have been the primary funding sources.

The RFA Program is a Department of the Interior program to enhance firefighter safety and strengthen fire protection capabilities. Funding requests are limited to training, equipment, and prevention activities. A maximum allowable contribution from the Department of the Interior

per Rural Fire Department per year is established at \$20,000. The Rural Fire Department has the capability to meet cost-share at a minimum of 10%, which may include in-kind services.

VFA, Title IV, is a federal matching funds program with dollars provided through the USDA Forest Service. The program is administered by the DNRC. RFA/VFA grants in the following amounts were obtained by the county (Table 5-6).

**Table 5-6. RFA/VFA grant money distributed to Carbon County 1975-2010.**

<b>Year</b>	<b>Grant Award</b>
1975-2000	\$ 33,729.93
2001	\$ 23,102.48
2002	\$ 28,177.14
2003	\$ 20,273.00
2004	\$ 30,000.00
2005	\$ 20,000.00
2006	\$ 22,000.00
2007	\$ 6,960.00
2008	\$ 17,950.00
2009	\$ 24,000.00
2010	\$ 20,000.00
<b>TOTAL</b>	<b>\$ 246,192.55</b>

### **5.9.2 Fire Apparatus Stationed in the County**

In addition to the local departments which include DNRC apparatus, there are apparatus maintained by the Bureau of Land Management stationed at Billings, and apparatus maintained by the Custer National Forest stationed in Red Lodge.

**Table 5-7. Rural fire district inventory of fire apparatus.**

<i>DEPARTMENT</i>	<i>APPARATUS TYPE</i>	<i>NAME</i>	<i>YEAR</i>	<i>MAKE</i>	<i>MODEL</i>	<i>AXIL</i>	<i>WATER (Gal)</i>	<i>PUMP (GPM)</i>	<i>PUMP (PSI)</i>	<i>CAFS?</i>
Absarokee	Type 1 Engine	Engine F9-1					750	1500		
Absarokee	Type 1 Engine	Engine F9-2					750	1200		
Absarokee	Type 1 Support Water Tender	Tender F9-4					2000	300		
Absarokee	Type 3 Engine	Engine F9-5					500	300		
Absarokee	Type 6 Engine	Engine F9-6					250			
Absarokee	Type 6 Engine	Engine F9-7					300			
Absarokee	Type 1 Support Water Tender	Tender F9-8					2500	350		
Absarokee	Type 6 Engine	DNRC 1666					250			
Absarokee	Type 6 Engine	DNRC 1897					500			
Bear Creek	Type 1 Engine	Engine 1					500	1250		
Bear Creek	Type 6 Engine	DSL 217				4x4	250	125		
Belfry	Type 2 Engine	Engine 92	1987	E-One			750	1250	200	
Belfry	Type 1 Tactical Water Tender	Tender 91	1988	Kenworth	T600		3000	500	180	
Belfry	Type 3 Engine	Wildland Engine 91	1999	Ford	F550	4x4	500	160	100	
Belfry	Type 3 Engine	Wildland Engine 93	1984	International		4x4	900	350	160	
BLM	Type 6 Engine	Engine 1061				4x4	400			Yes
BLM	Type 6 Engine	Engine 1062				4x4	300			
Bridger	Type 2 Tactical Water Tender	Engine 23	1994	International	466 Auto		1000	1200		
Bridger	N/A	Rescue 21	1999	Ford	F450	4x4	N/A	N/A	N/A	
Bridger	Type 4 Engine	Engine __	1971	GMC		6x6	750	31		
Bridger	Type 6 Engine	Engine __	1980	Chevy		4x4	250	350		
Bridger	Type 6 Engine	Wildland Engine 22	1983	Ford	F250	4x4	260		550	
Bridger	Type 6 Engine	Wildland Engine 23	2007	Ford	F450	4x4	300			
Bridger	Type 3 Engine	Wildland Engine 26	1997	Ford	F350	4x4	250		175	
Bridger	Type 1 Support Water Tender	Tender 27	2005	Kenworth	T800		4200	500		
Bridger	Type 1 Support Water Tender	Tender __	1987	Freightliner			4000			
Bridger	Type 1 Engine	Engine 24	1987	Ford	L-8000		1200	1200		
Edgar	Type 1 Engine	Engine 41	1970	International	2010		500	1000		
Edgar	Type 6 Engine	Wildland Engine 42	2005	Ford	F450	4x4	300	250		
Edgar	Type 6 Engine	Wildland Engine 43	1986	Ford		4x4	250	250		

Edgar	Type 4 Engine	Wildland Engine 44	1995	Freightliner	70	4x4	750	250		
Edgar	Type 4 Engine	Wildland Engine 45	1995	International	4900	4x4	750	250		
Edgar	Type 6 Engine	Wildland Engine 47	2009	Ford		4x4	500	?		
Edgar	Type 2 Support Water Tender	Tender 41	2005	International			3200			
Fromberg	Type 2 Support Water Tender	Tender 30					4000	200		
Fromberg	Type 2 Engine	Engine 32					500	1000		
Fromberg	Type 2 Engine	Engine 31					500	500		
Fromberg	Type 3 Engine	Wildland Engine 33	1973	Dodge	600	4x2	800	200		
Fromberg	Type 6 Engine	Wildland Engine 34	1989			4x4	200	125		
Fromberg	Type 6 Engine	Wildland Engine 35	1994			4x4	200	125		
Fromberg	Type 6 Engine	Wildland Engine 36	1974	Dodge		4x4	200	200		
Fromberg	N/A	QRU								
Fromberg	N/A	Light Truck								
Joliet	Type 1 Engine	Engine 11	1985				1000	1250	250	
Joliet	Type 1 Engine	Engine 12					750	1500	250	
Joliet	Type 1 Engine	Engine 14					3000	1250	250	Yes
Joliet	Type 6 Engine	Wildland Engine 15				4x4	500	250		
Joliet	Type 6 Engine	Wildland Engine 16				6x6	1100	125		
Joliet	Type 6 Engine	Wildland Engine 17				4x4	500	250		
Joliet	Type 3 Support Water Tender	Tender 11					1400	250		
Joliet	Type 3 Support Water Tender	Tender 12					1200	250		
Joliet	Type 3 Support Water Tender	Tender 14					1500	1000		
Joliet	N/A	Command 11				4x4	N/A	N/A		
Joliet	N/A	Command 12				4x2	N/A	N/A		
Joliet	Type 6 Engine	DSL 1760					400	125		
Joliet	Type 6 Engine	DSL 1803					200	250		
Laurel	Type 1 Engine									
Laurel	Type 2 Support Water Tender									
Laurel	Type 2 Support Water Tender									
Laurel	Type 4 Engine									
Laurel	Type 5 Engine									
Laurel	Type 6 Engine									
Laurel	Type 6 Engine									
Red Lodge	Type 1 Engine	Engine 71	2004	Pierce			1000	1250		Yes
Red Lodge	Type 1 Engine	Engine 73	1991	Pierce			500	1250		
Red Lodge	Type 5 Engine	Engine 72	2000	Ford		4x4	500	250		Yes
Red Lodge	Type 2 Engine	Engine 74	1986	GMC			700	1000		

Red Lodge	N/A	Rescue 71								
Red Lodge	Type 1 Engine	Ladder 71	1988	3D			300	1500		
Red Lodge	Type 5 Engine	Wildland Engine 76	1980	International		4x4	500	300		
Red Lodge	Type 5 Engine	Wildland Engine 77	1982	GMC		4x4	250	250		
Red Lodge	Type 5 Engine	Wildland Engine 78	2001	Ford	F550	4x4	500	250		
Red Lodge	Type 5 Engine	Wildland Engine 79	2002	Ford	F550	4x4	500	250		
Red Lodge	Type 1 Tactical Water Tender	Tender 71	2007	International		6x6	2500	250		Yes
Red Lodge	Type 1 Tactical Water Tender	Tender 72	2007	International		6x6	2500	250		Yes
Red Lodge	Type 1 Tactical Water Tender	Tender 73	1998	Freightliner		6x6		500		Yes
Red Lodge	N/A	Command 71				4x4				
Red Lodge	N/A	Command 72				4x4				
Red Lodge	N/A	Command 73	2010			4x4				
Red Lodge	N/A	Command Bus		International		2x4				
Roberts	N/A	Command 61	2000	Ford	F250	4x4				
Roberts	Type 1 Engine	Engine 61	2006	Rosenbauer			1000	1250		Yes
Roberts	Type 2 Support Water Tender	Tender 61	2008	Rosenbauer			2500	500		
Roberts	Type 6 Engine	Wildland Engine 63	1994	Dodge	3500	4x4	200	250		
Roberts	Type 6 Engine	Wildland Engine 64	1970	Kaiser	M3582	6x6	1000	250		
Roberts	Type 6 Engine	DNRC Wildland Engine 65	2008	Ford	F450	4x4	300	250		
Roberts	Type 3 Engine	Engine 66	1986	GMC		4x4	600	500		
USFS	Type 6 Engine	Engine 21				4x4	300			
USFS	Type 6 Engine	Engine 22				4x4	300			
USFS	Type 6 Engine	Engine 83				4x4	300			

### **5.10. Mitigation Goals, Objectives, Projects and Priority Rankings**

The following goals, objectives, and projects were originally developed and ranked by the Carbon County Fire Council in 2005 and reviewed/revise in 2012. The projects have been ranked as High, Medium, or Low. They were first ranked subjectively by the Chair of the Fire Council based upon values and lives at risk, how broadly they applied across the county, and the duration of affect. The projects were then reviewed, updated, and concurred with by the Fire Council members at their April 19, 2012 meeting in Bridger. Projects will be pursued dependent upon staff and dollar resources available.



**Table 5-8. Fire mitigation goals and objectives for Carbon County**

<b>Goal 1. Protect the public from loss of life and injury due to wildland fire</b>				
<b>Objective 1. Raise awareness about fire danger</b>	<b>Status</b>	<b>Projects</b>	<b>Rank</b>	<b>Lead</b>
Raise awareness of fire danger through an advertising campaign including a series of articles, mailings, and billboards	In Progress	Highway 212 Billboard; Fire Danger Sandwich boards; VFRA grant	Medium	DNRC, RFD
Better communicate with the local media about Red Flag warnings	In Progress	Weekly meetings of "Billings Area Restriction Group" during fire season	High	DNRC, DES
Develop maps of the wildland urban interface areas with safety zones and escape routes	Not Started		Medium	DES
<b>Objective 2. Ensure residents are prepared to evacuate</b>	<b>Status</b>	<b>Projects</b>		<b>Lead</b>
Develop or purchase evacuation pamphlets and distribute to rural residents	Not Started	USFS has developed and distributed public handout; "Ready, Set, Go" pamphlets should be evaluated	Low	USFS, CCSO
Develop evacuation kits to accelerate evacuation process	In Progress	completed for at-risk subdivisions	High	CCSO
Develop detailed WUI boundaries to identify at risk developments	Completed	CWPP	Medium	RFD, DES
<b>Goal 2. Protect firefighters from loss of life and injury due to wildland fire</b>				
<b>Objective 1. Ensure firefighters are adequately equipped and supported</b>	<b>Status</b>	<b>Projects</b>		<b>Lead</b>
Work with commercial providers to improve cellular communications in the Clarks Fork Valley	In Progress	Bridger south to State line and Rockvale/Silesa areas need better coverage	High	DES
Pursue grants for PPE and communications equipment upgrades	In Progress	Have received several grants to purchase PPE	Medium	RFD, DES
<b>Objective 2. Monitor and address specific risk factors</b>	<b>Status</b>	<b>Projects</b>		<b>Lead</b>
Monitor drought/insect/disease stress and mortality in timbered areas.	In Progress	USFS Blowdown report MFO-TR-08-03 for Beartooth District	Medium	USFS
Conduct training sessions on response to hazmat carried by the railroad / Pipelines	In Progress	Training sessions held at RFD by railroad and pipeline companies	Low	RFD, DES
Work with the State of Montana and the Custer National Forest to develop a safe area in the West Fork drainage	Completed	Fuel reduction projects; evacuation plan and Cascade fire	High	DNRC, USFS
Demolish the grain elevator at Edgar	Completed	Demolished	Low	

<b>Objective 3. Learn from each incident how to better protect fire fighters</b>	<b>Status</b>	<b>Projects</b>		<b>Lead</b>
Conduct after action review for all major incidents or at least one annually by the Fire Council.	In Progress	Major incidents often reviewed at Fire Council Meetings; AAR with USFS after Cascade Fire	Medium	RFD, USFS, DNRC
<b>Goal 3. Maximize protection of property from wildland fire in communities</b>				
<b>Objective 1. Ensure adequate response capability to protect existing assets</b>	<b>Status</b>	<b>Projects</b>		<b>Lead</b>
Continue to pursue grant opportunities for equipment and training	In Progress	Rural Fire Assistance grant for PPE and communications equipment	Medium	RFD, DES
<b>Objective 2. Maintain adequate water supply infrastructure</b>	<b>Status</b>	<b>Projects</b>		<b>Lead</b>
Inventory/assess water supply infrastructure (e.g., hydrants, pumps, backup generators)	In Progress	Annual fire hydrant checks	Medium	RFD
<b>Goal 4. Maximize protection of property from wildland fire in rural areas</b>				
<b>Objective 1. Provide technical expertise and staff resources to reduce fire danger in WUI areas</b>	<b>Status</b>	<b>Projects</b>		<b>Lead</b>
Pursue WUI fuel reduction projects in high risk areas around the county	In Progress	Greater Red Lodge Area (GRLA) Vegetation Management Project implemented by USFS; Carbon County Cooperative project implemented by BLM	High	USFS, BLM, RFD
Jointly develop a fuels reduction project for the Beartooth Face (Grove Creek Areas) area south of Belfry	In Progress	Low priority	Low	USFS, BLM, RFD
Continue work to implement to assist the 400 Ranch in fuel reduction	Completed		Medium	
Continue Forest Service project to offer fuels reduction around recreation residences in the Main Canyon and the West Fork of Rock Creek	In Progress	YBRA fuel reduction	Medium	USFS, RFD
Prepare an evacuation plan for each interface subdivision/area	In Progress	Developed for W Fork Drainage (Cascade Fire) and Cooney Dam area	High	CCSO
Attend a board meeting of the YBRA, the Girl Scouts, the Westminster Spires, and the Lion's Camp at the beginning of each summer to discuss fire prevention, fire protection, and evacuation plans	In Progress	USFS meets with groups annually/semi-annually as needed	Low	USFS

Meet with Klammerts Tie Yard to discuss fire prevention and encourage development of a prevention and response plan	Completed		Low	RFD
<b>Objective 2. Emphasize personal responsibility for protection of property</b>	<b>Status</b>	<b>Projects</b>		<b>Lead</b>
Host a Firewise workshop for rural subdivisions in the Red Lodge area.	Completed		Medium	
Target rural property owners and second home owners by including a fire prevention message with property tax notices.	Not Started		Medium	County
Assist Red Lodge Mountain in replacing wood roofs with non-combustible on four base area buildings, creating defensible space on the south side of the Administration building, and thinning to protect the Palisades quad lift	Not Started		Medium	USFS, RFD
Conduct home ignition hazard assessments in WUI areas	In Progress	Most of WUI areas near Red Lodge complete	Medium	RFD
Meet with individual property owners in USFS recreation areas to discuss fire protection	In Progress	Beartooth Ranger District Pursuing this	Low	USFS
<b>Objective 3. Eliminate major known hazards</b>	<b>Status</b>	<b>Projects</b>		<b>Lead</b>
Bury 12 miles of electrical lines in the West Fork of Rock Creek drainage	Not Started		Medium	USFS
<b>Objective 4. Enhance effectiveness of response</b>	<b>Status</b>	<b>Projects</b>		<b>Lead</b>
Create a map of the county showing water sources for fire fighting	Not Started		High	RFD, DES
Determine locations for additional water supplies and pursue funding to develop new water sources available for fire protection	Not Started		High	RFD, DES
Identify those areas of the county with constructed assets at risk and no physical access. Meet with property owners or subdivision associations to pursue remedies. (e.g. Bridges at Western Ranch Estates, WRE II and Shane Ridge Rd.)	Not Started		Medium	RFD
<b>Goal 5. Ensure new developments are designed for adequate fire protection</b>				
<b>Objective 1. Provide high quality technical review and input on all proposed development in the county</b>	<b>Status</b>	<b>Projects</b>		<b>Lead</b>
Have county attorney provide a training session for chiefs on providing input to subdivision review process	Not Started		High	County
<b>Objective 2. Guarantee subdivisions are constructed as approved</b>	<b>Status</b>	<b>Projects</b>		<b>Lead</b>

Ensure that subdivisions are built as approved and fire protection systems are initially and periodically certified	Not Started		High	County, RFD
<b>Objective 3. Educate locals who advise new residents and developers.</b>	<b>Status</b>	<b>Projects</b>		<b>Lead</b>
Develop and provide a workshop that would qualify for continuing education credits for architects, engineers, and realtors on defensible space and fire wise principles	Not Started		Medium	County, RFD
Develop and provide a workshop on defensible space and Firewise principles for the county planning staff and planning board	Not Started		Medium	RFD
<b>Goal 6. Ensure an effective, coordinated response to wildland fire incidents that covers the entire county</b>				
<b>Objective 1. Assist residents in areas currently not covered who are willing to meet legal requirements to obtain fire protection coverage</b>	<b>Status</b>	<b>Projects</b>		<b>Lead</b>
Explore inclusion of 'No Fire Protection' area southeast of Bridger into District	In Progress	Initial investigation underway	Medium	County
<b>Objective 2. Utilize available technology to assist in response</b>	<b>Status</b>	<b>Projects</b>		<b>Lead</b>
Implement the E-911 system	Completed			
Review new technologies to improve response/communications	In Progress	Emergency Notification System (ENS) grant	Medium	DES, CCSO
<b>Objective 3. Ensure cooperative agreements in place meet current needs</b>	<b>Status</b>	<b>Projects</b>		<b>Lead</b>
Develop new or update existing MOU's as needed	In Progress	Existing MOUs/Mutual Aid Agreements are current	Medium	County, USFS, RFD
<b>Objective 4. Maintain adequate numbers of qualified volunteers</b>	<b>Status</b>	<b>Projects</b>		<b>Lead</b>
Develop and/or purchase volunteer firefighter recruitment materials	In Progress	RFD7 grant for recruitment/retention staff	High	RFD
Work with the Carbon County News to feature one volunteer firefighter in the newspaper each month	Not Started			RFD
<b>Objective 5. Document response activities to support grant requests</b>	<b>Status</b>	<b>Projects</b>		<b>Lead</b>
Report all responses to the state as requested	In Progress	NFIRS	Medium	RFD, DES
Set up "call-out" data base in cooperation with dispatch center to document the number of responses	Not Started		Medium	RFD, DES

<b>Goal 7. Recognize fire as a natural process in ecosystem maintenance on lands where appropriate</b>				
<b>Objective 1. Determine those areas where return to natural regimes is desirable. Complete mapping of condition class for the county.</b>	<b>Status</b>	<b>Projects</b>		<b>Lead</b>
Develop desired condition maps, identifying condition class	In Progress	USFS has maps that show current condition; difficult to show desired conditions; not being pursued	Medium	USFS
Develop goals and projects to return those areas determined desirable to their natural fire regime and manage other lands appropriately	In Progress	Current/past fuels projects working toward this goal	Medium	USFS
Identify criteria for fire use allowing natural ignitions to continue burning within parameters	In Progress	AB Wilderness burn plan allows natural ignitions to burn; Non-wilderness allow fire to play natural role to meet mngt. Objectives	Medium	USFS

RFD = Rural Fire Districts; CCSO = Carbon County Sheriff's Office; DES = Disaster and Emergency Services; DNRC = Department of Natural Resources and Conservation;  
 BLM = Bureau of Land Management; USFS = US Forest Service

## **5.11. Implementation**

### **5.11.1 Roles and Responsibilities**

The goals in this Community Wildfire Protection Plan will be realized through implementation of the projects. The plan contains a variety of types of projects. Due to the variety, many individuals and agencies will play a role in project implementation.

Individual property owners will be responsible for educating themselves and taking appropriate action to create defensible space around their structures, both residential and commercial. Subdivision associations will have the opportunity to work with their local fire departments, state, and federal agencies to select specific fuel treatment alternatives.

Not-for-profit organizations such as the Yellowstone Bighorn Research Association, the Girl Scouts, and other various special use camp permit holders will be responsible for coordination with professionals in the agencies to obtain technical expertise and education, and to do fuel reduction treatments within their capabilities.

For-profit businesses may be involved in sharing expertise, as in the case of the Burlington Northern Santa Fe on hazardous materials. Or, they may be involved in infrastructure evaluation and upgrades, such as the cellular phone companies in the Clarks Fork Valley. The Carbon County News may be asked to run features about firefighters to assist in recruiting efforts. Beartooth Electric may look to partner with funding agencies to accomplish the project to bury overhead lines in the West Fork drainage. Private business may also obtain contracts for work identified in this plan to reduce fuel or other hazards.

County responsibilities fall in the area of education on existing regulations and investigation of additional regulatory needs. The county may also assist in bringing together parties for cooperative projects.

The Department of Natural Resources and Conservation (DNRC) will continue to provide assistance to local fire departments in the form of grants, technical expertise, and resources when wildland fires exceed local capacity.

The Bureau of Land Management (BLM) and Forest Service will both provide technical assistance, project funds, suppression assistance, educational materials, and training. The BLM may schedule and carry out fuels reduction project in cooperation with neighboring land owners including other agencies and private individuals as funding allows.

The Natural Resources Conservation Service may be asked to assist in monitoring the acreage enrolled in the Conservation Reserve Program as a way to better understand the fuel hazard.

The Federal Emergency Management Agency (FEMA) may provide grant funds to accomplish projects and may be involved in post-disaster assistance in the event of a catastrophic fire.

#### 5.11.2 **Schedule**

No firm schedule has been established for accomplishing the listed projects. Accomplishment of projects depends on the availability of resources and funding. Many of the projects can proceed through the efforts of an individual or individual agency or organization, such as the Forest Service fuel reduction program in the Main Fork of Rock Creek. Not all of the projects will require specific funding, for example, the County Attorney will likely be able to set up a training course for the county fire chiefs on subdivision regulations with no additional resources.

Other projects, for example the fuel reduction along the Beartooth Face, or creating defensible space around recreation residences will require bringing many parties to the table and the alignment of priorities and funding from several sources. These projects will proceed as the circumstances allow.

As required by the National Fire Plan, federal agencies are to align their funding and staff resources with the priorities expressed in this community wildfire protection plan. As a result, accomplishment of many of the projects will depend on the funding and staffing of the BLM and Forest Service. Additionally, the amount of VFA/RFA funds available to the local fire departments will have an effect on the ability of those departments to participate in the planning and execution of projects on the ground.

By jointly identifying the projects and their priorities with city, county, state, and federal partners, it is hoped that project planning and execution will be well coordinated and occur first on the highest priority projects.



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## **CHAPTER VI: PLAN MONITORING, MAINTENANCE, REVISION, AND COORDINATION**

### **Responsible Parties**

The Carbon County Commissioners in cooperation with the mayors of Bearcreek, Bridger, Fromberg, Joliet, and Red Lodge are responsible for ensuring that the Pre-Disaster Mitigation Plan (PDMP) is kept current. With adoption of the plan, the Commissioners designate the Carbon County Disaster and Emergency Services Coordinator--with the assistance of the Local Emergency Planning Committee (LEPC)--as the lead in accomplishing the on-going responsibility.

### **Plan Implementation**

The projects listed in Chapter IV are the means by which the county, city, and towns intend to realize the goals to become more disaster resistant. Accomplishing the projects will be dependent on funding, staff, and technical resources from a variety of sources including the county, towns, state and federal government, not-for-profits, and the business community.

Some of the projects can be undertaken by the county within existing resources. Examples of this would be the adoption of the new DFIRMs by the jurisdictions. Some of the projects can be completed by the county, city, or town with additional funding. The amount of funding needed depends on the project. One example would be the project to prepare a stormwater drainage plan for Red Lodge.

Projects will be accomplished as resources, either at the local, state or federal levels, become available. Those projects with a higher priority ranking would be considered first. Implementation of the plan will be the responsibility of the LEPC and the Carbon County Disaster and Emergency Services Coordinator acting on the behalf of the county. Plan implementation also depends on the willingness of other public entities, private business (such as the electric companies), and not-for-profit organizations such as the American Red Cross to participate in specific mitigation actions and projects.

In selecting projects to compete for funding whether it is existing internal funding or funding from state and federal sources, emphasis should be placed on the relative benefits compared to the cost of the project. The cost of the project should be considered and weighed against the dollar value or other measure of assets protected or potential reduction of damages. A basic cost benefit and/or value analyses should be completed during the planning of the project.

The municipalities and county understand that while completion of the plan will make them eligible to compete for additional funds, it is in the best interests of the local jurisdictions and residents to proceed with those projects that can be done within existing resources while exploring avenues to obtain assistance for those projects beyond local capabilities.

## **Plan Monitoring and Evaluation**

There are two types of plan monitoring and evaluation; effectiveness and implementation. Effectiveness monitoring looks at whether the plan has addressed needed items. Implementation monitoring looks at whether projects in the plan are being undertaken and completed. The Carbon County Disaster and Emergency Services Coordinator with the help of the LEPC will ask the following questions to evaluate the effectiveness and implementation of the plan.

- Have any potential hazards developed that were not addressed in the plan?
- Have any natural disasters occurred that were not addressed in the plan?
- Has any unanticipated development occurred that is vulnerable to hazards?
- Are there any additional mitigation ideas that need to be incorporated?
- Have projects been initiated and/or completed?
- What are the barriers to completing projects identified in the plan?

Each summer the LEPC will meet to ask and answer the questions listed above. The discussion will be documented so that when the plan is revised, the findings of the monitoring can be incorporated into the revision. The Carbon County Disaster and Emergency Services Coordinator will convene the LEPC for this purpose.

## **Plan Update Review Triggers**

Any of the following three situations could trigger a review and update of the plan.

- Occurrence of a major natural disaster in or near the county,
- Passage of five years, or
- Change in state or federal regulations which must be complied with.

## **Revision Procedures**

Should a major natural disaster (loss of life or greater than \$5million in damages) occur in Carbon County, the LEPC shall meet following the disaster to determine whether a review of the PDM Plan is warranted. In the absence of a major natural disaster, the five-year review will take place during the nine-month period preceding the FEMA approval anniversary date.

The Carbon County Disaster and Emergency Services Coordinator will publish a legal ad in the Carbon County News notifying the public that an update is being initiated and providing information on how and where to get information on the project and how to provide input. The coordinator will then convene the LEPC and with their assistance and/or the assistance of the Montana DES or a contractor as determined necessary, carry out the following tasks;

1. Review the Hazard Mitigation Plan Review Crosswalk form completed by Montana Disaster and Emergency Services (DES) and FEMA during their most recent review of the plan.
2. Examine and revise the risk assessment and development trends data as needed to ensure it is current.
3. Update the mitigation strategies to incorporate completion of actions and add any needed strategies or projects.
4. Identify problems that may be hindering or affecting implementation of the plan, and recommend actions for resolving those problems.
5. Recommend any necessary revisions to the PDM Plan.
6. Comply with all applicable regulations and statutes.

Forty-five days prior to the five-year anniversary date, a final draft of the revised plan will be submitted to the Montana DES. An annual review will be conducted by the Carbon County DES Coordinator for the purpose of summarizing the status and effectiveness of the plan mitigation goals or strategies.

### **Incorporation into Other Plans**

The Carbon County Growth Policy was updated in 2011. The Red Lodge Growth Policy is due for updating in 2013. None of the other local jurisdictions have land use plans. The Carbon County DES Coordinator will provide input into any updates of these or other applicable plans consistent with this 2011 PDM plan revision. This plan information is provided to the state so that when the statewide hazard mitigation plan is updated, this information can be included. No other planning efforts are anticipated or underway in the county.

### **Opportunity for Continued Public Involvement**

To ensure the public will have the opportunity to remain involved in the implementation and annual updates of the plan, the following will take place.

- 1) The Carbon County DES Coordinator will provide an annual summary presentation/report to the six governing bodies on what has been accomplished during the previous year and to receive guidance from the elected officials for the coming year.
- 2) Each year following the summer LEPC meeting called for the purpose of reviewing the status of the plan, the county will provide information to the Carbon County News to notify the public of the accomplishments of the previous year and allow comment for any revisions.



## **APPENDIX A: LEPC MEETINGS**



Chris Benton	Beartooth Billings Clinic Trauma Coordinator	PO Box 590 Red Lodge, Mt 59068	406-446-2345	406-425-3808	<a href="mailto:cbenton@beartoothhospital.org">cbenton@beartoothhospital.org</a>
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Richard Pringle	Red Lodge Police Department Chief	PO Box 9 Red Lodge, Mt 59068	406-446-3672	406-425-2776	<a href="mailto:rpringle@vcn.com">rpringle@vcn.com</a>
Mark Brajcich	Red Lodge Schools Superintendent	PO Box 1090 Red Lodge, Mt 59068	406-446-1903	406-425-2292	<a href="mailto:mark_brajcich@redlodge.k12.mt.us">mark_brajcich@redlodge.k12.mt.us</a>
Hunter Bell	Roberts Rural Fire District #6	5 S. 1 <sup>st</sup> St. PO Box 196 Roberts, Mt 59070	406-445-9161	406-670-5633	<a href="mailto:Hb3@tctwest.net">Hb3@tctwest.net</a>

**Carbon County LEPC Meeting Agenda  
Red Lodge, MT.  
November 15, 2011**

**What is a PDM Plan?**

- Purpose
- Contents

**What is the revision process?**

- Roles
- Schedule

**Hazards profiled in the original plan**

- Review and edit/validate

**Goals and Projects in the 2005 plan**

- Review goal statements
- Status of projects

**Next Steps**

- Contractors
- LEPC



**Carbon County LEPC Meeting Agenda  
Red Lodge, MT.  
November 15, 2011**

**What is a PDM Plan?** (a briefing paper was handed out and will be posted on the county’s website)

- Purpose: Barb explained that the overall purpose of revising the plan is to reduce the chance for loss of life and property damage from natural hazards. Keeping the plan current also allows the county to remain eligible for post-disaster assistance, such as what the county received following the flooding at Joliet this past spring. The PDM plan differs from the EOP in that the EOP is a response plan, the PDM plan identifies projects that can be done ahead of time to lessen the chances and/or impacts of a disaster.
- Contents: PDM plans have an introduction that talks about the county and development trends; hazard profiles that provide information on past occurrences, their frequency, damages, risks, and probability of future incidents; mitigation goals and projects; and a chapter that addresses implementation, monitoring and revision. The plan also contains documentation of the planning process and all meetings.

**What is the revision process?**

- Roles: Each of the following entities has a role in the revision of the PDM plan—the county, the city, the towns, the LEPC, the contractors, the public, the state, and FEMA. Barb explained the roles of each of these groups.
- Schedule: The following is the project schedule. Things may progress more quickly than this.

Month	Activity
November 2011	Kick-off meeting
November 2011	First LEPC meeting to familiarize members with process, revisit hazard list and goals and projects from 2005 plan
December 2011-January 2012	Update the hazard profiles
January 2012	Second LEPC meeting to present updated hazard information and discuss goals and projects
Feb-March 2012	Public meetings, meetings with city and town councils
April	Draft plan out for public review and comment
May	Incorporate comments, send to state and FEMA for review
June	FEMA review, jurisdictions adopt plan
	Implementation

**Hazards profiled in the original plan**

- Review: The following hazards were profiled in the 2005 plan; avalanche, dam failure, drought, earthquake, earth movement, flood, hazardous material incidents, human and animal disease, severe weather (hail and thunderstorms), winter storms, tornadoes, volcanoes, wildland fire.

The LEPC agreed that all of these were still appropriate with the possible exception of human and animal disease. Barb will follow up with the public health department to get their input on this decision. Disease is not typically included in pre-disaster mitigation plans. One additional hazard was suggested, a fire conflagration in a community.

### **Goals and Projects in the 2005 plan**

- Review goal statements: the following goals are taken from the 2005 plan.
  - 1) Manage impacts of severe winter storms.
  - 2) Build and maintain capability to respond to wind events.
  - 3) Minimize frequency and impact of HAZMAT incidents.
  - 4) Be prepared to respond to floods as a result of dam failure, flash floods, and river flooding.
  - 5) Reduce and minimize the morbidity, mortality, and economic impact of human and animal disease.

The LEPC discussed these goals. There was a question about how HAZMAT incidents could be mitigated. Project ideas for holding an emergency preparedness event/fair, looking into sheltering arrangements, and addressing the importance of electricity surfaced during the discussion. Some additional ideas were already listed as projects in the 2005 plan. Barb suggested that the goal statements probably need to be updated and asked the LEPC participants to think about the goals.

- Status of projects: Barb explained that at the kick-off meeting, the DES and Deputy DES Coordinators plus two of the contractors went through the list of projects from the 2005 plan to determine the status of the projects. This was provided on a handout to the LEPC. We can revisit these original projects and build from that for the revision.

### **Next Steps**

- Contractors will be updating the hazard profiles between now and the January LEPC meeting.
- LEPC agenda: The PDM topic will be placed on the January 2012 LEPC agenda and the contractors will present information from the updated hazard profiles and discuss goals and projects.

**Carbon County Pre-Disaster Mitigation Plan Revision  
LEPC Meeting  
November 15, 2011  
Red Lodge, Montana**

Name	Representing	Phone	E-Mail
Richard Truog	RIPD	338-2736 / 446-5672	rjtrug@redlodge.com
Anna M. ...	PL ...	425-...	anna@redlodge.com
Darrel Kraun	DES	446-1038	dkraun@carboncountymt.us
Doug Tucker	County	446-1575	dtucker@carboncountymt.us
Thomas Puyet	CCSO	446-1234	tpuyet@carboncountymt.us
TOM KOHLER	Contractor	425-2071	TK@MAPMURKUS.COM
LINDA ...	...	425-7589	ljbarbora@yahoo
John ...	BBC	446-2412	john@carboncountymt.us
John ...	...	446-...	john@carboncountymt.us
John ...	County	425-0122	jg@carboncountymt.us

**CARBON COUNTY LEPC MINUTES/DOCUMENTAION**

MEETING DATE: \_\_\_12-20-11\_1300 RED LODGE FIRE/RESCUE HALL\_\_\_\_\_

<b>TOPIC</b>	<b>Opportunities for Improvement Discussion/Conclusions</b>	<b>Action Plan Follow-Up</b>	<b>Final Outcome Evaluation Loop Closure</b>
Minutes approved as written with additions (old business) & with verbal approval by those in attendance (see attendance sheet)	See Below	See Below	See Below
<b><u>SPECIAL REPORTS</u></b>			
Joliet Radios	No discussion		
Dispatch Operations	EMD – on hold for now per Sheriff Rieger, No other discussion held		
Public Health	Gina discussed starting a CERT for Carbon County.		
Barb Beck meeting with Fire Chiefs in Fromberg on 1-19	Discussion held on the County update of the EOP	Barb to continue to update as needed	Continued discussion
<b><u>COMMITTEE REPORTS</u></b>			
MAAD Committee		Gina absent will provide Ongoing Update per Roberta	Ongoing discussion

**CARBON COUNTY**

**LEPC**

**ATTENDANCE**

**DATE & TIME:** 12-20-2011 1300

**PLACE :** RED LODGE FIRE/RESCUE

**CHAIR:** AARON MCDOWELL

<b>Attendees</b>	<b>Program/Service/Unit/Department</b>
CHRIS BENTON	BBC
THOMAS RIEGER	CCSO
DAN MCJUNKIN	CCSO
BARB BECK	BECK CONSULTING
ROBERTA CADY	BBC PUBLIC HEALTH
CHARLIE HANSON	MT DES
DARREL KRUM	CARBON DES
JOHN PRINKKI	CARBON CO. COMMISSIONER
TOM KOHLEY	CONTRACTOR - DES

**Carbon County LEPC Agenda  
Red Lodge Fire Hall  
1300, January 17, 2012**

**Quick Review**—What is a PDM Plan?

**Revisit Hazard List**

Which hazards are specific jurisdictions vulnerable to?

**Problem Statements**

Develop problem statements and identify potential mitigation actions

**Project Ideas**

List project ideas by jurisdiction based on problem statements

**What's next?**

Where we are in the process

How to find and review draft documents for the planning process

**LEPC Meeting Notes  
Red Lodge Fire Station  
January 17, 2012**

**Quick Review**

- What is a hazard mitigation plan and why is it being prepared?

Contractor, Barb Beck, provided copies of the briefing paper about the PDM process to those who had not attended previous meetings where the PDM plan was discussed. She explained that this plan is different from the EOP which is a response plan. The PDM tries to identify what can be done ahead of time to prevent or lessen the potential for property damage and loss of life. Maintaining a current plan allows the adopting jurisdictions to be eligible for project grants and post-disaster assistance.

**Past Disasters in Carbon County**

- Some facts about damages and frequencies from the hazard profiles

AMEC, the contracted engineering firm is updating the hazard profiles. Barb received a preliminary draft of the updated profiles and shared a few of the numbers. The county has three high-hazard dams. The county has \$794 million in building assets and \$25.5 million in bridges. Most of these buildings are residential structures and most are wood frame construction. The county has one day of hail per year on average. There are on average 8 severe thunderstorm watches in a year. There have been no earthquakes reported for the county by the U.S. Geological Service since 1990. Earthquakes that occur elsewhere may sometimes be felt in the county, but Carbon County is at low risk for earthquakes. The county has only had three reported tornadoes since 1955 according to the National Climate Data Center (others have likely gone unreported.) Fixing the Beartooth Highway slide cost over \$15 million.

**Problem Statements and Mitigation Projects**

- Review list of hazards

The LEPC identified which jurisdictions in the county were at risk for the various natural hazards.

Hazard	Jurisdiction(s) at Risk
Avalanche (snow)	County
Dam Failure	County, Red Lodge
Drought	All
Earthquake	All
Earth movement, subsidence	Bridger, County, Red Lodge
Flood	All
Hazmat	All
Hail, thunderstorm, winds	All
Winter storms	All
Volcanoes	All
Wildland Fire	All



- Develop problem statements

Barb gave several examples of problem statements developed in other counties. The plan must consider a variety of types of mitigation projects. Those types of projects include; emergency services, education, structural, natural resource protection, prevention, and property protection.

The LEPC identified the following problems and potential mitigation actions/projects considering the risks to the various jurisdictions and the types of projects possible.

Problem Statement	Potential Mitigation Project
There is no means to effectively communicate with the public during emergencies.	Develop an emergency notification system.
The public is not aware of disaster and emergency services information and resources.	Utilize the county website to post information.
There is only one fiber optic line between Billings and Red Lodge. If that line is compromised (and it has been in the past) emergency communications go down (radios and cell phones.)	Have and be prepared to use satellite phones and ham radios. Switch from the county courthouse to use the Fire Department as the point of contact. Increase redundancy.
The fiber optic line serving the county hangs below the road bridge at Joliet. The line is vulnerable to flooding and debris in Rock Creek.	Relocate or raise this line to reduce the vulnerability.
People are not knowledgeable about flood insurance and what is covered.	Education effort on flood insurance
The water line serving the town of Joliet hangs below the road bridge at Joliet. The line is vulnerable to flooding and debris in Rock Creek.	Relocate or raise the line.
The Warren area is not covered by a fire district.	Consider forming a district or charging property owners for response.
The CWPP needs more detail about the wildland urban interface to tie in with hazard fuel reductions projects.	Update the plan to address this.
A number of areas in the county with fire danger or other natural hazard risks have only one means of ingress and egress.	Identify these areas and develop means to address them (additional road access up West Fork is needed.)
Wildland urban interface boundaries are not well-defined and may not include all needed areas.	Map these areas and add to plan.
Many rural residents have not posted their fire numbers.	Education effort. Consider policy remedies. Update map books.
The dike on Rock Creek at Grapevine Road protecting 4 homes and the railroad track has washed out.	Find funding to replace the dike.
Abutments on numerous county bridges are in the floodplain and vulnerable to flooding.	Replace the bridges with support outside the floodplain.
County is not yet compliant with new narrow band radio requirements. (1/1/2013)	Find funding to do this conversion
Unused bridge abutments in Rock Creek south of Joliet catch debris and increase flood hazard for Joliet.	Remove abutments

## Next Steps

- Schedule, where to get information, how to stay involved

The hazard profile updates will be completed. Barb will be meeting with the town and city councils and the commissioners to develop an updated project list. The PDM plan goals will be reorganized to address each jurisdiction. Tom and Barb will be meeting with the County Fire Chiefs January 19.

Barb and Tom will come back to the LEPC later this winter/spring with a project list. The draft plan will be available for the public to look at and comment on this spring. Information on the planning process is being posted on the county's website.

[www.co.carbon.mt.us](http://www.co.carbon.mt.us)

**Carbon County Pre-Disaster Mitigation Plan Revision  
LEPC Meeting  
January 17, 2012  
Red Lodge, Montana**

Name	Representing	Phone	E-Mail
John Blaine	Public Works	425-2342	john.blaine@carboncountymt.gov
Don Stinson	CC Commissioner	497-4788	donstinson@carboncountymt.gov
Jeff Stuckwell	USFS	446-4538	jstuckwell@fs.fed.us
John Smith	Public Works	446-1598	john.smith@carboncountymt.gov
Tom Kenney	PAW/DES	425-2571	tom@mtmtn.com
Ray Swenson	Ray Swenson Consulting	446-1861	vay@raysvenson.com
John Crewell	Commissioner	425-6122	jcrewell@cc.carbon.mt.us
Darrel McKim	DES	446-1038	dkim@cc-carbon.mt.us
Thomas Ringer	Shovel	446-1234	tringer@carboncountymt.us
Jim Munsie	Shovel	446-1234	dmunsie@carboncountymt.us
Wally Kimball	Shovel	446-1234	wkimball@carboncountymt.us
Don Stinson	Commissioner	446-1234	donstinson@carboncountymt.us
Paula Bede	Public Works	446-2428	hutch@carboncountymt.us
Dennis	Public Works	446-2428	dennis@carboncountymt.us

**Carbon County Pre-Disaster Mitigation and CWPP Plan Revision  
County Fire Council Meeting  
January 19, 2012  
Fromberg, Montana**

Name	Representing	Phone	E-Mail
Greg Maddox	Baldy	664-3198	Greg.D.Maddox@adco.com
Dave Weinstein	Edgar	208-3935	daveweinstein@yahoo
Shane Stern	Bridger	371-3134	ssstern33@gmail.com
David Lawrence	Bridger	671-0151	DJL1276@VAHO.COM
Tom Kuntz	Red Lake	555-6198	firechief@montana.net
Derek Yerber	DNRC	692-5182	DYERBER@MT.GOV
Jeff Stockard	USFS	446-4538	jstockard@fs.fed.us
Melvin Haberac	Juliet Fire	620-8920	mhaberac@jfire.com
Darrel M Krum	Carbon DES	446-1038	dKrum@co.carbon.mt.us
Gary Hart	Farmberg	668-7323	gg1hart@aol.com
Mike Veahlberg	Fromberg	668-7477	chroney99@yahoo.com
Paula Beck	Red Lake	446-3628	beathred@kramer.net
Tom Koenig	MAP MURALS	425-2671	TKM@MAPMURALS.COM

## **CARBON COUNTY LEPC MEETING**

Tuesday, March 20, 2012

Red Lodge Fire Hall

1:00 p.m.

### **AGENDA**

- I. Call to Order
- II. Review of Last Meeting's Minutes
- III. Chair resignation & appointment of chairperson
- IV. Old Business
  - PDM Plan follow-up: Barb Beck
- V. New Business
- VI. Next strategic planning session
  - Tuesday, March 27, 1:00 p.m.  
Red Lodge Fire Hall
- VII. Next regular LEPC meeting
  - Tuesday, April 17, 1:00 p.m.  
Red Lodge Fire Hall







## **APPENDIX B: MEETINGS WITH ELECTED BODIES**

**Bearcreek Town Council Meeting  
February 1, 2012  
Bearcreek Town Hall**

Mayor, Jennifer Jessen, presiding, all three council members, the town clerk, the town water/sewer/streets foreman, and town zoning administrator were present. Two citizens were present.

**Pre-Disaster Mitigation Planning**

Contractor Barb Beck explained that this effort is to update the existing PDM for the county and all of the five incorporated jurisdictions. She handed out a briefing paper about the project to all present.

Barb explained that the county received a grant to update the plan and that the county is providing the local match. Updating the plan and then adopting it will provide Bearcreek with the opportunity to apply for grant funds and also ensure post-disaster assistance for the town if that is needed in the future. To be eligible to adopt the plan, a jurisdiction must have at least one mitigation project in the plan.

The role of the town is to participate in identification of projects, review draft chapters and provide comments, adopt the plan, and implement the plan. Implementation of any projects identified for the town will be conditioned upon the availability of resources (staff and/or technical and/or financial resources.)

The group discussed the fact that Bearcreek is not vulnerable to many of the hazards present in the rest of the county. They are potentially vulnerable to flooding, severe summer storms, and severe winter storms. After discussion, the council asked that two projects be included in the plan for Bearcreek.

- 1) Look into obtaining detailed floodplain mapping to refine the current DFIRM, and
- 2) Find a solution to having the town's portable backup generator stored outside by either insulating an existing shed behind town hall or building a new shed.

**Next Steps**

Barb explained that she would be meeting with each of the elected bodies in the county this month, then will hold two public meetings in the county. Following that, the draft plan will be assembled and made available for a 6-week public review period. After the public review period, the plan will be finalized and sent to the state and FEMA for approval. Once FEMA has approved the plan, the town can adopt it. Barb encouraged anyone interested to check the county's website and read the draft chapters.

MEETING TIME IS 7:00 PM AT BRIDGER TOWN HALL  
108 S D STREET  
BRIDGER TOWN COUNCIL AGENDA

February 7, 2012

MINUTES:

APPROVE CLAIMS:

COMMITTEE REPORTS:

Sink or Swim: Krystal Zentner

CITIZEN ADVISORY REPORTS:

PUBLIC COMMENT:

BRIDGER REACT PARKS PROPOSITION: Lilly Kraft, Avery Loverdi

~~LIBRARY FILTERING INTERNET FOR GRANT:~~

LIBRARY BOARD APPOINTMENT:



DISASTER MITIGATION & COMMUNITY WILDFIRE PROTECTION PLAN:

Barb Beck

QUESTION OVER WATER BILL CHARGES: Alan Hull

FACTORY BUILDING LEASES:

~~RAISE FOR JUDGE RIEGER:~~

LETTER OF RESIGNATION FROM POLICE CHIEF MCNEILEY:

HIRE FOR BRIDGER POLICE DEPARTMENT:

ZONING APPLICATIONS:

Roger Snyder

TOWN PERSONNEL POLICY:

REVIEW PROPERTY INSURANCE:

AUDIT CONTRACT-BI-ANNUAL:

NEW CHAIRS FOR COUNCIL TABLE:

PUBLIC COMMENT:

TOWN ATTORNEY: Hope Freeman

POLICE REPORT: Mike Buechler

**Bridger Town Council Meeting**  
**February 7, 2012**  
**Bridger Town Hall**

Mayor DeRudder presiding, all four council members, the town clerk, the town public works director, and the acting chief of police were present. Carbon County Disaster and Emergency Services Coordinator, Darrel Krum was present. Fifteen citizens were present. The topic was noticed on the town council agenda prior to the regularly-scheduled meeting.

**Pre-Disaster Mitigation Planning**

Contractor Barb Beck explained that this effort is to update the existing PDM for the county and all of the five incorporated jurisdictions. She handed out a briefing paper about the project to the town council and staff.

Barb explained that the county received a grant to update the plan and that the county is providing the 25% local match. Updating the plan and then adopting it will provide Bridger with the opportunity to apply for grant funds and also ensure post-disaster assistance for the town if that is needed in the future. To be eligible to adopt the plan, a jurisdiction must have at least one mitigation project in the plan.

The role of the town is to participate in identification of projects, review draft chapters and provide comments, adopt the plan, and implement the plan. Implementation of any projects identified for the town will be conditioned upon the availability of resources (staff and/or technical and/or financial resources.)

Barb listed the types of projects that can be considered for the PDM plan; emergency services, public awareness and education, prevention, structural projects, natural resource protection, and property protection. She gave several examples of each type of project.

The natural hazards that residents of the town might be vulnerable to would include flooding, drought, hazardous materials spills, summer storms (hail, wind, lightning, and tornadoes), winter storms, and wildland fire. The town is in pretty good shape on most of these. Flood potential is limited. One previous flood occurred from the canal during the winter. Although there is a state highway and railroad passing through town there is no interstate and there are no hazardous material generators.

One project has been identified for Bridger based on a meeting with the Fire Chief Council for the county. Barb is working with Assistant Chief Lawrence on identifying a project to address the area south of Bridger that is not incorporated into a fire district. Town of Bridger is currently providing these county residents with services for no reimbursement or tax revenue. The council concurred with Barb's suggestion that she contact Public Works Director, Tim Goldsberry, directly to inquire about any other specific project ideas or needs. Bridger will have one goal to mitigation hazards and any projects identified can fall under that goal.


## **Next Steps**

Barb will be meeting with each of the elected bodies in the county this month. After that there will be two public meetings in the county to present the draft plan and take comments. One of these two meetings will be in Bridger. Following that, the draft plan will be assembled and made available for a 6-week public review period. After the public review period, the plan will be finalized and sent to the state and FEMA for approval. Once FEMA has approved the plan, the town can adopt it if they choose to. There is no downside to adopting the plan and it offers advantages for residents in the form of post-disaster assistance and the ability to compete for project funds. Darrel Krum pointed out that the state currently has funding for mitigation project. FEMA has provided project funds to the state as a result of flooding last year.

Anyone interested was encouraged to check the county's website and read the draft chapters as they become available.

TOWN OF FROMBERG  
SPECIAL REGULAR TOWN COUNCIL MEETING  
Monday, February 13, 2012  
**6:30 PM**

Meeting Agenda:

- 1 Call to Order
- 2 Pledge of Allegiance
- 3 Review and Adopt Agenda
- 4 Minutes
- 5 Bills
- 6 Employee Reports
- 7 Correspondence
- 8 40 Acres: Denine Hritz - 11 Bar S Realty
- 9 Garbage Ordinance # 254 - Second Reading
- 10 Speed Bumps - Jim Perkins
- 11  Barb Beck – Disaster Planning
- 12 Zoning - Belty Anderson
- 13 Duties Of Town Officers And Town Council
- 14 Discussion Of Appointing A Spokesperson For The Council –  
Jim Perkins
- 15 Water Bill #1 Bartlett – Jim Perkins
- 16 Proposed Resolution For Restricting Access To Town Records And  
Town Properties – Dave Flint
- 17 MMIA Training For New Mayor And Town Council
- 18 YTD Budget Review

Old Business:

Other Business:

Public comment: (For those items NOT on the agenda)

Next meeting date:

Adjourn:

**Fromberg Town Council Meeting  
February 13, 2012  
Fromberg Town Hall**

Council President, Perkins, presiding, three additional council members, the town clerk, the town public works director, the town attorney, and the chief of police were present. Carbon County Disaster and Emergency Services Coordinator, Darrel Krum was present. Eleven citizens were present. The topic was noticed on the town council agenda prior to the regularly-scheduled meeting.

**Pre-Disaster Mitigation Planning**

Contractor Barb Beck explained that this effort is to update the existing PDM for the county and all of the five incorporated jurisdictions. She handed out a briefing paper about the project to the town council and staff.

Barb explained that the county received a grant to update the plan and that the county is providing the 25% local match. The overall goal of the plan is to reduce the potential for loss of life and property damage from natural hazards. Updating the plan and then adopting it will provide Fromberg with the opportunity to apply for grant funds and also ensure post-disaster assistance for the town if that is needed in the future. As a local example of the benefits of participating in the plan, the county will be recovering just under half a million dollars from FEMA for flood damages incurred by the county last spring in the Joliet area as a result of having this plan. To be eligible to adopt the plan, Fromberg must have at least one mitigation project in the plan.

The role of the town is to participate in identification of projects, review draft chapters and provide comments, adopt the plan, and implement the plan. Implementation of any projects identified for the town will be conditioned upon the availability of resources (staff and/or technical and/or financial resources.)

Barb listed the types of projects that can be considered for the PDM plan; emergency services, public awareness and education, prevention, structural projects, natural resource protection, and property protection. She gave several examples of each type of project and explained the projects that Bearcreek and Bridger had identified so far for inclusion into the plan (detailed floodplain mapping, sheltering a generator, safety messages on water bills, and addressing a fire district issues.)

The natural hazards that residents of the town might be vulnerable to could include flooding, hazardous materials spills, summer storms (hail, wind, lightning, and tornadoes), winter storms, and wildland fire. The town is in pretty good shape on most of these. Flood potential is limited. The town attorney pointed out a past instance when properties in town had flooded when the sewer system had backed up. Although there is a state highway and railroad passing through town there is no interstate and there are no hazardous material generators.



Discussion about needs for Fromberg included the following points suggesting five possible projects.

- Fromberg does not have back-up power for the water and wastewater treatment systems. And, the town's system does not have back-up valves. The town would like grant assistance to purchase valves and then ask property owners to install them.
- There is only one water line that serves the west side of town. The line passes under the railroad tracks. If that line was compromised the west side of town would not have water. An additional line needs to be installed.
- The police chief must convert his analog radio to narrow band. He needs assistance for this at \$1500.
- Coverage of the town by fire hydrants is inadequate. The town needs additional hydrants and a maintenance and testing program.
- The school needs a separate water line from the storage tank for adequate fire protection.

Barb will follow up with the public works director and get back to the council with the draft list of projects. DES Coordinator, Krum reminded the councilors that if they applied for and received grant funds they would still be required to provide a local match.

### **Next Steps**

Barb will be meeting with each of the elected bodies in the county this month. After that there will be two public meetings in the county (in Bridger and Red Lodge) to present the draft plan and take comments.

Following that, the draft plan will be assembled and made available for a 6-week public review period. The town will be provided with a hard copy of the draft plan for review. After the public review period, the plan will be finalized and sent to the state and FEMA for approval. Once FEMA has approved the plan, the town can adopt it if they choose to. There is no downside to adopting the plan and it offers advantages for residents in the form of post-disaster assistance and the ability to compete for project funds. Darrel Krum pointed out that the state currently has funding for mitigation project. FEMA has provided project funds to the state as a result of flooding last year.

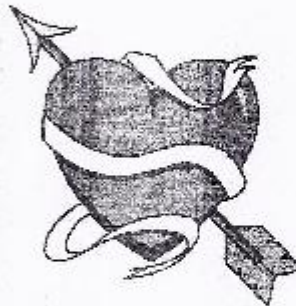
Anyone interested was encouraged to check the county's website and read the draft chapters as they become available.

TOWN OF JOLIET, MT  
TOWN COUNCIL MEETING  
MONDAY FEBRUARY 27, 2012



6:30 pm - Work Session  
7:00 pm - Public Hearing - Water Improvement Project  
7:00 pm - Regularly Scheduled Meeting

- 1) Meeting Call to Order
- 2) Pledge of Allegiance
- 3) Consent Agenda
- 4) Public Comment
- 5) Minutes/Disbursements
  - a) Jan 23, 2012 Reg Mtg Minutes
  - b) Feb 2012 Disbursements
- 6) Mayor/Council Reports
- 7) Employee Reports
- 8) Unfinished Business
- 9) **New Business**
  - a. Zoning Change Request - 201 E Front
  - b. **Barb Beck - PDM**
  - c. Junk Vehicle Ordinance 7-6-36: 2nd Rdg
- 10) Correspondence
  - a. MDT - Speed Zone Study Request
  - b. Historical Preservation
- 11) Public Comment
- 12) Meeting Adjourned



**Joliet Town Council Meeting  
February 27, 2012  
Joliet Town Hall**

Mayor Sorrells presiding, all four council members, the town clerk, the town public works director, the chief of police, and the town attorney were present. Carbon County Disaster and Emergency Services Coordinator, Darrel Krum was present. Eight citizens were present. The topic was noticed on the town council agenda prior to the regularly-scheduled meeting.

**Pre-Disaster Mitigation Planning**

Contractor Barb Beck explained that this effort is to update the existing PDM and CWPP plans completed in 2005 for the county and all of the five incorporated jurisdictions. She handed out a briefing paper with contact information about the project to the town council and staff. The overall goal of the plan is to reduce the potential for loss of life and property damage from natural disasters.

Barb explained that the county received a grant to update the plan and that the county is providing the 25% local match. Updating the plan and then adopting it will provide Joliet with the opportunity to apply for grant funds and also ensure post-disaster assistance for the town if that is needed in the future. To be eligible to adopt the plan, a jurisdiction must have at least one mitigation project in the plan. The town is not required to participate nor adopt the plan, but adoption of the plan helps protect the citizens in addition to the grant possibilities and the post disaster assistance.

The PDM plan asks the question “What can we do ahead of time to reduce our risk of damage from a natural disaster?” The federal government began emphasizing prevention years ago following repeated flooding along the Mississippi River. Prevention is almost always more cost effective than responding during and afterwards. The PDM plan contrasts with the Emergency Operations Plan or EOP. The county also has an EOP and this describes how the response to a disaster will occur.

The role of the town is to participate in identification of projects, review draft chapters and provide comments, adopt the plan, and implement the plan. Implementation of any projects identified for the town will be conditioned upon the availability of resources (staff and/or technical and/or financial resources.)

Barb listed the types of projects that can be considered for the PDM plan; emergency services, public awareness and education, prevention, structural projects, natural resource protection, and property protection. She gave examples of each type of project.

The council members and town staff identified the following problems and projects for Joliet:

Problem	Potential Project
The concrete pillars from the old railroad bridge on the south end of town create a flood hazard for the town.	Remove these pillars. (Note: this was identified in the 2005 plan and was a contributing factor to flooding of the town in the spring of 2011.
There is no way to warn people in Joliet. The one existing siren on town hall is inoperable.	Replace the siren on town hall. One siren will reach the entire community.
There is an abandoned ditch running west to east on the north side of the highway. The ditch has mature cottonwoods. The cottonwoods have dead branches that are creating both a wind and fire hazard.	Work with private land owner to trim branches and remove trees as they die.
Rock Creek is cutting new courses along the floodplain. On the north end of town this has the potential to threaten the wastewater treatment system of lagoons. On the east side of town the bridge on the Joliet-Fromberg Road could eventually be threatened. The bridge holds a pipe carrying the town's water supply and communications lines.	Monitor the stream course and protect critical infrastructure at these locations with stream structures as needed.
The town will be required to convert to narrow band radios in the fall of 2012. Existing law enforcement radios are non-compliant.	Purchase two mobile and three handheld digital radios for law enforcement.
When the county converts to narrow band in the fall of 2012, coverage by existing repeaters is expected to decline. Joliet is in a location that will likely be adversely affected by this change.	Support county in adding a repeater at Joliet.
The water system has back-up power. The town hall and school do not.	Support county purchase of mobile generator.

### Next Steps

Joliet's projects will be incorporated into the project list.

Barb will present a draft of the plan to the county's LECP in mid-March. After that there will be two public meetings in the county to present the draft plan and take comments. The meetings will be held in Red Lodge and Bridger. Following that, the draft plan will be finalized and made available for a 6-week public review period. The town will be provided with a hard copy of the draft and it will also be posted on the county's website.

After the public review period, the plan will be finalized and sent to the state and FEMA for approval. Once FEMA has approved the plan, the town can adopt it if they choose to. There is no downside to adopting the plan and it offers advantages for residents in the form of post-disaster assistance and the ability to compete for project funds. Darrel Krum pointed out that the state currently has funding for mitigation projects. FEMA has provided project funds to the state as a result of flooding last year.

**City of Red Lodge  
Emergency Services Council Committee Meeting  
Red Lodge City Hall  
February 14, 2012**

Participants: Aldermen Williams, Mahan, and Richter, Assistant Police Chief Scott Cope, Fire Chief Tom Kuntz, Amulance Director Aaron McDowell, Development Director, Forrest Sanderson, Barb Beck

Contractor, Beck provided the project briefing handout and explained the process of updating the PDM plan. The group briefly discussed potential projects. Beck invited the participants to contact her with additional project ideas and explained that there would be a draft plan out for a 6-week public review period this spring.

Project ideas: find a way to relocate large commercial propane tanks away from the population outside of the city, work with MDT when it plans a highway project through downtown to address inadequate water supply for fires in commercial district by enhancing water infrastructure, continue fire hydrant testing and replace hydrants as needed.

**City of Red Lodge  
Public Works Council Committee Meeting  
Red Lodge City Hall  
February 14, 2012**

Participants: Aldermen Mahan, Richter, Schoenike, Public Works Director Skip Boyer, Development Director Forrest Sanderson

Contractor, Beck provided the project briefing handout and explained the process of updating the PDM plan. The group briefly discussed potential projects. Beck invited the participants to contact her with additional project ideas and explained that there would be a draft plan out for a 6-week public review period this spring.

Project ideas: continue to work with FEMA and adopt the final DFIRMS when they are available, complete a storm drainage plan for the city, remove concrete abutments in Rock Creek at two locations to prevent ice jam flooding, care for trees in the city parks.

**Red Lodge City Hall, February 14, 2012  
Meeting with Red Lodge Building Inspector, Tim Swansborough**

Project ideas: City of Red Lodge to maintain building inspection program, adopt updated versions of the International Building Code (IBC) and the International Residential Code (IRC) as available and apply within city limits.

# CARBON COUNTY COMMISSIONERS AGENDA

**DATE:** FEBRUARY 27, 2012 (Monday)

**8:00 AM PUBLIC COMMENT PERIOD** – On matters within the Commissioners Jurisdiction

**8:30 AM**

**9:00 AM**



**9:30 AM UPDATE ON CARBON COUNTY'S DISASTER MITIGATION PLAN – BARB BECK**

**10:00 AM DNRC FIRE EQUIPMENT & COOPERATIVE FIRE CONTROL AGREEMENT WITH DNRC – DARREL KRUM**

**10:30 AM**

**11:00 AM**

**11:30 AM**

**12:00 PM LUNCH**

**1:00 PM INTERVIEW GROUP HEALTH INSURANCE VENDORS**

**1:30 PM**

**2:00 PM**

**2:30 PM**

**Carbon County Commission Meeting  
February 27, 2012  
County Administration Building, Red Lodge**

All three commissioners, John Grewell, Doug Tucker, and John Prinkki were present. The commissioners' two administrators, Carbon County Disaster and Emergency Services Coordinator, Darrel Krum, and contractors Barb Beck and Tom Kohley were present. The topic was noticed on the commissioners' agenda and in the Carbon County News prior to the regularly-scheduled meeting.

Contractor Barb Beck explained that the update of the PDM and CWPP is now halfway through the process from the time standpoint and more than halfway done with respect to the work. The project is slightly ahead of schedule. The major pieces of work that are done or nearly done include:

- 1) Hazard profiles: the engineering firm has completed their work, now Barb and Darrel are adding some local information and checking the work.
- 2) Meeting with the county fire chiefs to go through the project list from the 2005 plan and identify new projects. Now updating the project list and WUI boundaries based on methodology developed by Jon Trapp of Red Lodge Fire Rescue. Tom will meet again with the fire council in April to have them validate the new project list.
- 3) Have met with the other elected bodies in the county to explain the project and solicit project ideas. Over the past month, Barb and Darrel have visited with the Bearcreek, Bridger, and Fromberg town councils, two council committees of the city of Red Lodge (Emergency Services and Public Works), and will be making a presentation to the Joliet town council this evening. The Red Lodge city council has asked for a presentation when the draft is available. The project has been well received at each of these meetings and the communities have offered their own project ideas. So far all of the jurisdictions have indicated they will want to adopt the plan.

A draft of the mitigation chapter was handed out to the commissioners and the projects listed for the county were discussed. The county's projects have been identified by the LEPC or moved forward from the 2005 plan. There is a nice range of project types across all of the jurisdictions. The commissioners pointed out that Joliet is already pursuing the project to remove the old railroad bridge concrete pillars in Rock Creek south of town. Barb will remove this from the county's list and place in under the goal for Joliet. The private landowner will need to be involved in this as well. Project 6.1.b will be reworded to protect the critical infrastructure of the Two Mile Bridge and the Red Lodge City wastewater lagoons. Also for project 6.1.c a district was created in the 1970's and that should be the party responsible for replacing the washed out dike at the end of Grapevine Road. Project 6.1.f will be reworded.

Commissioner Tucker mentioned that an accident at the oil tank farm at Edgar could be a concern for local responders. Upon discussion, the hazard may not be that great. Barb will follow up with the Fire Chief to see if any help—such as an evacuation plan or training—is needed to prepare for an incident. The group discussed generators. Much of the critical infrastructure in the county is without back-up power. It's difficult to know if and how many mobile generators might be needed. Barb will ask Joliet tonight about their situation (note: neither Joliet school nor town hall has back-up power.)



## **Next Steps**

The changes to the county projects discussed at this meeting will be made. Joliet's projects will be incorporated into the project list after the meeting tonight.

Barb will present a draft of the plan to the county's LECP in mid-March. After that there will be two public meetings in the county to present the draft plan and take comments. The meetings will be held in Red Lodge and Bridger. Then the draft plan will be finalized and made available for a 6-week public review period. After the public review period, the plan will be finalized and sent to the state and FEMA for approval. Once FEMA has approved the plan, the county can adopt it by resolution.



**APPENDIX C: LOCAL JURISDICTION ASSETS**



Northland Casualty Company  
St. Paul, MN 55102

**COMMERCIAL PROPERTY  
COVERAGE PART DECLARATIONS**

BEAR CREEK

Effective Date: 03/12/2011 12:01 A.M. at your mailing address

Policy No: WS119784

Named Insured:  
TOWN OF BEAR CREEK



**DESCRIPTION OF PREMISES**

PREM. BLDG # # Location (Including County, Zip Code), # of Stories, Construction, Occupancy, Protection Class

001 001 143 RFD, Bear Creek, ND, 58007, 1 Story, Non-Residential, R11

**COVERAGES PROVIDED** Insurance at the Described Premises applies only for Coverages for which a Limit of Insurance is shown below.  
\*\*IF EXTRA EXPENSE COVERAGE, LIMITS ON LOSS PAYMENTS FF - Fully Faced

PREM. #	BLDG #	Coverage	Limit of Insurance	Percent of Coinsurance**	Covered Causes of Loss	Rates	Premium
001	001	Building	\$ 200,000	80%	Special Code BLDG	\$200	\$ 1,368.00
001	001	Personal Property of Others	\$ 10,000	80%	Special Code BLDG	\$200	\$ 60.00

**COVERAGE OPTIONS** Applicable only when entries are made in the Schedule below. \*\*APPLIES TO BUSINESS INCOME ONLY

PREM. #	BLDG #	Coverage	Agreed Value Expir. Date	Replacement Cost Amount	Replacement Cost	*Mo. Limit of Indemnity	*Max. Period of Indemnity	*Extended Period of Indemnity	Inflation Guard %
001	001	Building				x			
001	001	Personal Property of Others				x			

**DEDUCTIBLE \$ 500**

**COVERAGE PART PREMIUM \$ 1,428.00**

**MORTGAGE HOLDERS**

Mortgage Holders as scheduled on S2767-CP, if applicable.

**FORMS AND ENDORSEMENTS**

The schedule of coverage declarations, forms and endorsements shown on S1D-ILS make up your policy as of the effective date shown above.

THESE DECLARATIONS AND THE COMMON POLICY DECLARATIONS, IF APPLICABLE, TOGETHER WITH THE COMMON POLICY CONDITIONS, COVERAGE FORMS AND ENDORSEMENTS HEREIN, ISSUED TO FORM A PART HEREOF, CONSTITUTE THE ABOVE DESCRIBED POLICY.

City of Bridger  
 Pollution Schedule  
 7/1/12

Module Name	Address	State	ZIP Code	Occupancy	Site Description	Area	Location Notes
BRIDGER, CITY OF	101 W BROADWAY	MT	59014	WAREHOUSE	S. YERAGE BLDG	300	
BRIDGER, CITY OF	113 W. BROADWAY	MT	59014	PUBLIC LIBRARY	LIBRARY	1,248	
BRIDGER, CITY OF	23 TRIBUTARY ROAD	MT	59014	BEACHERS	RODDED BLEACHERS	0	
BRIDGER, CITY OF	23 CEMETARY ROAD	MT	59014	CONCRESSION	RODDED CONCRESSIONS	304	
BRIDGER, CITY OF	201 C STREET	MT	59014	STORAGE BUILDING	POOL CHANGE HOUSE	1,124	
BRIDGER, CITY OF	201 C STREET	MT	59014	HEATER & FILTER	FILTER HOUSE	261	
BRIDGER, CITY OF	201 C S. BLVD	MT	59014	PUBLIC WOL.	POOL	5,480	
BRIDGER, CITY OF	201 SOUTH B STREET	MT	59014	CITY OFFICES	LANDED ARI	4,052	
BRIDGER, CITY OF	206 C S. BLVD	MT	59014	PARK ENTRANCE	GAZTROWALKWAY	196	
BRIDGER, CITY OF	216 S. MAIN STREET	MT	59014	STORAGE	STORAGE GARAGE	1,333	
BRIDGER, CITY OF	212 SOUTH C ST.	MT	59014	COMMUNITY CENTER	CIVIC CENTER	2,480	
BRIDGER, CITY OF	212 SOUTH C ST.	MT	59014	VOLUNTEER FIRE STATION	FIREHOUSE #1	1,616	
BRIDGER, CITY OF	212 SOUTH C ST.	MT	59014	VOLUNTEER FIRE STATION	FIREHOUSE #2	3,200	
BRIDGER, CITY OF	301 E. GARRON	MT	59014	FIGHTING STATION	TRUCKHOUSE	1,500	
BRIDGER, CITY OF	C THIRD STREET	MT	59014	LIGHT INDUSTRIAL	NEW TOWN SHOP	2,400	
BRIDGER, CITY OF	LANS. CARLSON ST.	MT	59014	WELL HOUSE	MANUFACTURING BLDG	32,000	
BRIDGER, CITY OF	EAST OF P STREET	MT	59014	SEWER TREATMENT	PUMP HOUSE #3	379	
BRIDGER, CITY OF	MILL-DAY COUNTY ROAD	MT	59014	SEWER TREATMENT	SEWER RI-OVER BLDG.	72	
BRIDGER, CITY OF	SOUTH B ST.	MT	59014	WELL HOUSE	LANSJON PONDS	0	
BRIDGER, CITY OF	SOUTH B STREET	MT	59014	WELL HOUSE	WATER TOWER	0	
BRIDGER, CITY OF	WEST PARK AVE	MT	59014	RAIL PARK	PUMP HOUSE #1	330	
BRIDGER, CITY OF	108 SOUTH D STREET	MT	59014	NEW CITY OFFICES	PUMP HOUSE #2	612	
BRIDGER, CITY OF	Tract 11 Cominy Road @ Railroad	MT	59014		SOFTBALL COMPLEX	0	
					TWIN CARL COTTAGE		
					MOBILE UNITS		
					Abandon Railroad Tract	15 Acre	





**TOWN OF JOLIET  
PROPERTY VALUES AS OF 7-1-12**

Site #	Address	Site Description	Bldg. \$	Contents \$	Flood Zone	Construction Type	Sq Feet	Year Built	Total \$
100	116 S MAIN	CITY HALL	218,069	40,568	X	ALL COMB (WOOD FRAME)	1,506	1935	268,637
102	116 S MAIN	CITY SHOP	6,068	10,973	X	CONCRETE BLOCK	1,400	1950	72,041
101	125 N MAIN	FIRE STATION PUMP HOUSE	6,368	27,431	X	ALL COMB (WOOD FRAME)	55	1965	33,799
101	129 S MAIN	FIRE STATION	194,973	26,237	X	ALL STEEL	2,545	1975	220,210
102	EAST OF TOWN	SEWER BUILDING	23,277	54,853	X	CONCRETE BLOCK	270	1986	78,140
102	EAST OF TOWN	SCREW PUMPS	112,500	0	X	CONCRETE BLOCK	0	1985	112,500
102	EAST OF TOWN	LAGOON POND	412,000	0	X	EARTH FILL	0	1985	472,349
103	S 1ST	PARK PUMP HOUSE	23,288	14,264	X	ALL COMB (WOOD FRAME)	150	1991	37,550
103	S 1ST	PARK CONCESSIONS	6,862	2,185	X	ALL COMB (WOOD FRAME)	200	1985	11,057
103	S 1ST	PARK RESTROOM	8,566	2,195	X	CONCRETE BLOCK	100	1985	10,761
103	S 1ST	PARK PLAYGROUND EQUIP.	7,700	0	X	PLASTIC	200	1985	7,700
104	S MAIN @ CREEK	ROCK CREEK PUMP HOUSE	33,510	17,559	X	ALL COMB (WOOD FRAME)	246	1950	51,068
104	S MAIN @ CREEK	ROCK CREEK PUMP HOUSE	5,290	0	X	ALL COMB (WOOD FRAME)	196	1935	5,290
106	STATE STREET	WELL #6	21,844	1,866	X	ALL STEEL	144	2001	23,709
106	VARIOUS LOCATIONS	EDP EQUIPMENT	0	3,292	N/A	UNKNOWN	0	N/A	3,292
107	MAIN @ US 212	PARK EQUIPMENT	0	3,072	X	N/A	7/8	N/A	3,072
108	SOUTH OF TOWN	WATER TANK	250,000	0	X	CONCRETE BLOCK	7/8	1990	250,000
108	305 E FRONT	LIBRARY	0	278,550	X	BOOKS	n/a	1990	278,550
900	VARIOUS LOCATIONS	CONTRACTOR EQUIPMENT				EQUIP (CONTRACT)			1,929,743
900	VARIOUS LOCATIONS	VEHICLES (RC)				VEHICLES			#REF!
901	VARIOUS LOCATIONS	VEHICLES (RC) 100K+				VEHICLES (RC) 100K+			#REF!
			1,387,303	542,440					#REF!

REC'D WADSWORTH CITY OF

CITY OF WADSWORTH

LINE NO.	DESCRIPTION	QUANTITY	UNIT	AMOUNT	TAXES	TOTAL	STATUS	DATE	REMARKS
101	CONCRETE	100	YD	100.00	0.00	100.00	PAID	12/31/00	
102	CEMENT	50	TON	50.00	0.00	50.00	PAID	12/31/00	
103	STEEL	20	TON	20.00	0.00	20.00	PAID	12/31/00	
104	BRICK	1000	UNIT	1000.00	0.00	1000.00	PAID	12/31/00	
105	ROOFING	50	UNIT	50.00	0.00	50.00	PAID	12/31/00	
106	PAINT	10	UNIT	10.00	0.00	10.00	PAID	12/31/00	
107	LABOR	1000	HOUR	1000.00	0.00	1000.00	PAID	12/31/00	
108	EQUIPMENT	50	UNIT	50.00	0.00	50.00	PAID	12/31/00	
109	PERMITS	1	UNIT	1.00	0.00	1.00	PAID	12/31/00	
110	INSURANCE	100	UNIT	100.00	0.00	100.00	PAID	12/31/00	
111	UTILITIES	100	UNIT	100.00	0.00	100.00	PAID	12/31/00	
112	MAINTENANCE	100	UNIT	100.00	0.00	100.00	PAID	12/31/00	
113	TRAVEL	100	UNIT	100.00	0.00	100.00	PAID	12/31/00	
114	OFFICE SUPPLIES	100	UNIT	100.00	0.00	100.00	PAID	12/31/00	
115	TELEPHONE	100	UNIT	100.00	0.00	100.00	PAID	12/31/00	
116	POSTAGE	100	UNIT	100.00	0.00	100.00	PAID	12/31/00	
117	TRAINING	100	UNIT	100.00	0.00	100.00	PAID	12/31/00	
118	CONTRACTS	100	UNIT	100.00	0.00	100.00	PAID	12/31/00	
119	LEGAL	100	UNIT	100.00	0.00	100.00	PAID	12/31/00	
120	ADVERTISING	100	UNIT	100.00	0.00	100.00	PAID	12/31/00	
121	RESEARCH	100	UNIT	100.00	0.00	100.00	PAID	12/31/00	
122	DEVELOPMENT	100	UNIT	100.00	0.00	100.00	PAID	12/31/00	
123	OPERATIONAL	100	UNIT	100.00	0.00	100.00	PAID	12/31/00	
124	ADMINISTRATIVE	100	UNIT	100.00	0.00	100.00	PAID	12/31/00	
125	OTHER	100	UNIT	100.00	0.00	100.00	PAID	12/31/00	







**APPENDIX D: STATUS OF PROJECTS IN 2012**

### Mitigation Projects

<i>Number</i>	<i>Project</i>	<i>Ranking</i>	<i>Status in 2011</i>
<b>GOAL ONE</b>	<b>Manage Impacts of Severe Winter Storms</b>		
1.1.a	Assist utilities in snow removal to restore power.	Medium	Ongoing
1.1.b.	Purchase back-up generators for shelter locations	Medium	No action
1.1.c.	Purchase back-up generators on trailers to be cached	Medium	No action
1.1.d.	Support preparation of utility Emergency Restoration plans	Medium	Plans have been done by utilities
1.2.a.	Utilize new communications trailer	Medium	Trailer was used for Cascade Fire and law enforcement incident
1.2.b.	Pursue improved cellular communications in Clarks Fork Valley	<b>High</b>	Completed. Three new towers have been erected
1.2.c.	Continue to issue storm warnings	<b>High</b>	Ongoing
1.2.d.	Add a repeater at Bridger	Medium	Completed
1.3.a.	Distribute winter storm information to new residents	Medium	Initiated. County working on emergency notification system.
1.3.b.	Invite NWS to make school presentations	Medium	No action
1.3.c.	Media spots on winter survival	Low	No action
1.4.a.	Maintain shelter agreements with the American Red Cross	<b>High</b>	Revisit due to ARC's reorganization.
1.4.b.	Develop a shelter plan for stranded individuals	<b>High</b>	No action
1.4.c.	Educate people about shelter plan	<b>High</b>	No action
1.5.a.	Publish county snow removal priorities annually	Medium	Ongoing. County has developed and posted a map.
1.5.b.	Develop a list of snow removal equipment in the county.	Medium	No action
1.5.c.	Implement an agreement with Wyoming DOT for snow removal.	Medium	No action
1.5.d.	Implement an agreement with Park County, WY. for snow removal	Medium	No action

Note:

**No action** means that the project has not been initiated.

**Ongoing** means that there has been activity and the project is continuing.

**Completed** means that there is no additional work needed on the project.

**N/A** means the project is no longer applicable for some reason.

<i>Number</i>	<i>Project</i>	<i>Ranking</i>	<i>Status in 2011</i>
<b>GOAL TWO</b>	<b>Build and Maintain Capability to Respond Quickly to Wind Events</b>		
2.1.a.	Assess tree hazards and contract a faller	Medium	City of Red Lodge has completed hazard tree inventory for public ROWs.
2.1.b.	Educate the public to report trees down on power lines	Medium	Ongoing by Northwestern Energy.
2.2.a.	Brochures for building material and practices to avoid wind damage	Medium	Ongoing in Red Lodge through building inspector
2.2.b.	Sponsor weather spotter training	Medium	Ongoing. Annually
2.2.c.	Educate public about utility R-O-W clearing	Medium	No action
2.3.a.	Purchase weather radios	Medium	No
2.4.a.	Enforce Red Lodge building codes	Medium	Ongoing
2.4.b.	Host program on building material and standards for wind events	Medium	No action
<b>GOAL THREE</b>	<b>Minimize frequency and impact of hazmat incidents</b>		
3.1.a.	Assess past hazmat spills	Medium	No action
3.2.a.	Obtain hazmat training	Medium	Completed. Several classes
3.2.b.	Review agreements for hazmat response	<b>High</b>	Ongoing
3.2.c.	Update/execute new hazmat response agreements as needed	Medium	Ongoing
3.2.d.	Obtain hazardous materials list from BNSF	Medium	No action
<b>GOAL FOUR</b>	<b>Be prepared to respond to floods as a result of dam failure, flash floods, and river flooding</b>		
4.1.a.	Educate citizens about dam failure warning system	Medium	Completed for Glacier Lake Dam
4.1.b.	Provide information about building in the flood plain	Medium	Ongoing by county floodplain administrator
4.1.c.	Invite the NWS to make a presentation on flooding	Medium	Completed. Presentation in Joliet, spring 2011 flooding.
4.2.a.	Maintain network of flood watchers	Medium	Ongoing. County purchased monitoring equipment.
4.2.b.	Broadcast weather warnings through dispatch	<b>High</b>	Ongoing as conditions dictate
4.3.a.	Remove old bridge abutments in Rock Creek	Medium	No action
4.3.b.	Develop a storm drainage plan for Red Lodge	Medium	Ongoing with City and MDT
4.3.c.	Address drainage problem at Cedarwood Villa Nursing Home	Medium	New sidewalk. Problem not solved.
4.3.d.	Work with FEMA to study floodplain delineations	<b>High</b>	Ongoing. Draft DFIRMS prepared, published in Federal Register.

<i>Number</i>	<i>Project</i>	<i>Ranking</i>	<i>Status in 2011</i>
4.3.e.	Produce maps of revised floodplains as appropriate	Medium	Ongoing
4.4.a.	Implement E-911, reverse calling	<b>High</b>	Ongoing
4.4.b.	Devise warning system for failure of Glacier Lake Dam	Medium	Ongoing. County purchased equipment.
4.4.c.	Devise warning system for failure of Cooney Reservoir	Medium	Completed. Evacuation plan written, distributed.
4.4.d.	Maintain sand bag supplies	Medium	Ongoing
<b>GOAL FIVE</b>	<b>Reduce and minimize the morbidity, mortality, and economic impact of human and animal disease in Carbon Co.</b>		Goal Five is no longer applicable to the PDM plan. Public Health has independent plans.
5.1.a.	Develop education campaign about benefits of immunization	<b>High</b>	<b>N/A</b>
5.1.b.	Continue with infectious disease protection education	<b>High</b>	<b>N/A</b>
5.1.c.	Sponsor animal disease awareness training	Medium	N/A
5.1.d.	Educate the public about proper disposal of animal carcasses	Medium	N/A
5.1.e.	Mosquito control	<b>High</b>	<b>N/A</b>
5.2.a.	Develop protocol for mass carcass disposal	Medium	N/A
5.2.b.	Identify one or more locations in county for mass carcass disposal	Medium	N/A
5.2.c.	Order wall charts for situation assessment	Medium	N/A
5.2.d.	Raise public awareness about animal disease resources	Medium	N/A
5.3.a.	Coordination with DPHHS for health officer during incident	Medium	N/A
5.3.b.	Educate officials about health planning	Medium	N/A
5.4.a.	Improve communications between health officials in county	Medium	N/A
5.4.b.	Sponsor veterinarian continuing ed	Medium	N/A
5.4.c.	Form an EPI Team in the county	Medium	N/A

## **APPENDIX E: PUBLIC INFORMATION**



**Briefing Paper—November 2011**  
**Carbon County**  
**Pre-Disaster Mitigation Plan Update**

**What is a pre-disaster mitigation plan (PDM)?**

A PDM plan looks at natural hazards that the county, Bearcreek, Bridger, Fromberg, Joliet, and Red Lodge may be susceptible to and ways to lessen the potential disasters caused by those hazards. The county's existing plan, approved in 2005, is being updated to make sure the county and communities remain disaster-resistant and less vulnerable to property damage and loss of life from a natural disaster. To remain current, the state and the Federal Emergency Management Agency (FEMA) require that the plan be updated every five years. By successfully revising the plan, the county will continue to be eligible to compete for project funds. The county will also be eligible for post-disaster assistance from the state and/or FEMA, in the event of a major disaster. Adoption of the plan is voluntary, but each jurisdiction--the county and the two communities--will need to have at least one mitigation project in the plan and adopt the plan if they wish to qualify for funding and assistance.

**What is in the plan?**

The plan will contain profiles of natural hazards such as flooding or wildfires, vulnerability to each hazard, and a history of past disasters. Potential losses from future disasters will be estimated. Accomplishments since the original plan was adopted will be listed, and goals and projects identified by citizens and local governments will be prioritized and added as appropriate. The plan will also have an explanation of how it was developed, a review of other related plans, and copies of news articles and notes from meetings held to discuss the plan.

**How will the plan be revised?**

Using FEMA funds passed through the state, the county has contracted for the plan update with Beck Consulting located in Red Lodge. Working with Carbon County Disaster and Emergency Services, the county, and the five incorporated communities over the next eight months, Ms. Beck and subcontractors AMEC, Inc. and Map Murals will review other local plans for consistency, update the hazard profiles, and work with elected officials and the Local Emergency Planning Committee (LEPC) to gather input and develop any needed additional goals and projects. A draft plan will be made available for public review in the spring and comments received will be incorporated. The county will submit the plan to the state and FEMA for technical review. Finally, Bearcreek, Bridger, Fromberg, Joliet, Red Lodge, and Carbon County will have the opportunity to adopt and then implement the plan.

**How do we offer input?**

Input is encouraged any time until adoption by the governing bodies targeted for late spring of 2012. Input from the public and knowledgeable individuals will help make the plan the highest quality possible. Public meetings will be designed to offer opportunity for input and all meetings will be noticed and open to the public. The Carbon County News will be provided with the meeting information and periodic updates. Questions or comments can be submitted by phone, in writing, or by e-mail to Darrel Krum, Carbon County Disaster and Emergency Services, 446-1038, [dkrum@co.carbon.mt.us](mailto:dkrum@co.carbon.mt.us), or Barb Beck at 406 446-3628, [barbbeck@bresnan.net](mailto:barbbeck@bresnan.net), P.O. Box 870 Red Lodge, MT. 59068. Visit the county's website at [www.co.carbon.mt.us](http://www.co.carbon.mt.us) for current information on the planning process.

Carbon County News 1/12/2012

## Carbon County Pre-Disaster Mitigation Plan Update

By Beth Back  
What is a pre-disaster mitigation plan (PDMA)?

A PDMA plan looks at natural hazards that the county, Hemetree, Bridget, Frontiers, Joliet and Red Lodge may be susceptible to and ways to lessen the potential damages caused by these hazards. The county's existing plan, approved in 2005, is being updated to make sure the county and citizens are ready for disaster-resistant and less vulnerable property damage and loss of the financial and disaster. To remain current, the state and the Federal Emergency Management Agency (FEMA) require that the plan be updated every five years. By successfully providing the plan, the county will continue to be eligible to compete for grant funds. The county will also be eligible for pre-disaster assistance from the state and/or FEMA, in the event of a major disaster. Adoption of the plan is voluntary, but each jurisdiction—the county and the two communities—will need to have at least one mitigation project in the plan and adopt the plan if they wish to qualify for funding and assistance.

What is in the plan?  
The plan will contain profiles of natu-

ral hazards such as flooding or wildfires, vulnerability to each hazard, and a history of past disasters. Future losses from future disasters will be estimated. Any restrictions since the original plan was adopted will be listed, and goals and projects identified by citizens and local governments will be prioritized and added as appropriate. The plan will also have an explanation of how it was developed, a review of other related plans, and copies of laws, articles and laws from relevant health to discuss the plan.

How will the plan be reviewed?

Using FEMA funds passed through the state, the county has reserved for the plan update with local consulting located in Red Lodge. Working with Carbon County Disaster and Emergency Services, the county and the five incorporated communities over the next eight months, Ms. Back and subcontractor Altha, Inc. and Map Marts will review other local plans for consistency, update the hazard profiles, and work with elected officials and the Local Emergency Planning Committee (LEPC) to gather input and develop any needed additional goals and projects. A

draft plan will be made available for public review in the spring and comments received will be incorporated. The county will submit the plan to the state and FEMA for technical review. Finally, Brantock, Bridget, Frontiers, Joliet, Red Lodge, and Carbon County will have the opportunity to adopt and then implement the plan.

How do we offer input?

Input is encouraged any time until adoption by the governing bodies targeted for late spring of 2012. Input from the public and knowledgeable individuals will help make the plan the best, quality possible. Public meetings will be designed to offer opportunity for input and all meetings will be noticed and open to the public. The Carbon County News will be provided with the meeting information and periodic updates. Questions or comments can be submitted by phone in writing, or by email to Darrel Kinn, Carbon County Disaster and Emergency Services, 416-1036, 317000, carbon@ccnews.com, or Beth Back at 407-476-9228, bback@ccnews.com, P.O. Box 877, Red Lodge, MT, 59069. Visit the county's website at www.carboncountymt.gov for current information on the planning process.

# Hazard Planning Underway in County

Carbon Co. News

By Barb Beck

Do you remember the flooding we had last spring in Joliet and other locations around the county? How about the hailstorm that hit so many roofs last summer, and don't forget the Hole in the Wall fire up on the plateau last summer? If you were directly affected you certainly would remember those disasters, and although fortunately no lives were lost, they were costly in terms of property damage and response. In order to anticipate and prepare for future potential disasters, Carbon County is now updating the Pre-Disaster Mitigation Plan. "This plan looks at the natural hazards we are vulnerable to and what we might do ahead of time to reduce potential damage," said County Disaster and Emergency Coordinator Darrell Krum. Earthquakes, floods, severe winter storms, and wildland fires are some of the natural hazards to which citizens of Carbon County could be vulnerable.

The original plan, prepared in 2005 is being updated by contractors Barb Beck and Tom Kohley under the guidance of the Local Emergency Planning Committee or LEPC. The work is being funded by the Federal Emergency Management Agency (FEMA) with a 25% county match. The purpose of the plan is to reduce the chances for loss of life and property damage due to natural disasters. All five incorporated communities plus the county will be covered under the plan and have the opportunity

to adopt it when completed. Towns, cities, and counties that adopt their local plans can be better prepared and remain eligible for assistance following future disasters.

According to Carbon County's Disaster and Emergency Services Coordinator, Darrell Krum, "We need to think about the things we could be vulnerable to ahead of time, such as flooding for example, and take steps to minimize risks where we can. We can't necessarily prevent natural disasters like wildfires or floods, but hopefully we can lessen the impacts and avoid loss of life when we do have a disaster."

The contractors are currently researching the history of disasters in the county as a basis for predicting future risk and reviewing the existing list of goals and projects in order to update them. The LEPC will be discussing the goals at its next regularly scheduled meeting. The meeting will be held at 1 p.m. on Tuesday, Jan. 17, at the Red Lodge Fire Hall. The public is welcome to attend and participate in the discussion. According to Beck, "We'll be meeting with each of the elected bodies in the county later this winter to incorporate their project ideas and then have a draft of the plan completed this spring. Once we get it done, the draft plan will be posted on the county's website for people to look at and make comments."

For additional information you can contact either Darrell Krum 446-1038 or Beck at 446-3628.



# Backcountry Film Festival World Tour coming to Red Lodge

The Beartooth Recreational Trails Association hosts the Winter Wildlands Alliance Backcountry Film Festival World Tour on Friday, March 2, at 1360st the Elks Club in downtown Red Lodge.

This year's films include: Best of the Festival "Solitaire", by Sweetgrass Productions. Best Short Award: "Chalk and Ski", by Purple Orange. Best of the Backcountry Award: "Breaking Trail", by Powderwhore. Other films include: 40 Tribes

Kyrgyzstan; Berber Turns; Ski Bums Never Die; Winners of My 15k; Season's Winter, Bike, Ski, Raft, and Dermal Traverse.

Based in Boise, Idaho, Winter Wildlands Alliance is a national nonprofit organization promoting and preserving winter wildlands and a quality human-powered snowsports experience on public lands. Beartooth Recreational Trails Association (BRTA) was organized to continue operations of the Red Lodge Nordic Center and to promote

year round non-motorized trails in and around Red Lodge. For more information about BRTA, go to [www.beartoothtrails.org](http://www.beartoothtrails.org).

Tickets are \$7 for adults and \$5 for children 14 and under. Tickets will be sold only at the door. Food & beverages available starting at 6 p.m. Films will begin at approximately 7 p.m., after the Red Lodge Winter Carnival Cardboard Class parade. Door prizes will be drawn at intermission. All proceeds benefit BRTA.

## Commissioners' Agenda

### FEB. 23

- 8 a.m. Minutes/Mail
- 8:30 a.m. Public Comment Period- On matters within the Commissioners' Jurisdiction
- 9 a.m. County Attorney
- 10 a.m. Discussion on fees set for Carbon County
- 10:30 a.m. Resolution- Regarding instalation of cattle guards
- 11 a.m. Airport Board Meeting

### 12 noon Lunch

2 p.m. Request for proposals for Carbon County Gro Up Health Insurance are due and will be reviewed by Health Insurance Committee.

### FEB. 27

- 8 a.m. Public Comment Period- On matters within the Commissioners' Jurisdiction
- 9:30 a.m. Update Carbon

### County's Disaster Mitigation Plan- Barb Beck

- 10:00 a.m. DNRC Fire Equipment and Cooperative Fire Control Agreement with DNRC - Darrel Krum
- 12 noon Lunch
- 1 p.m. Interview Group Health Insurance Vendors



March 8, 2012

## Carbon County Briefs

### RED LODGE

#### Red Hats

The Red Hats of Red Lodge will meet at 11:30 a.m. for lunch and socializing, March 13 at Café Regis. All women who will admit to being 50 are invited. If you are under 50, join us as a Lady in Waiting. Any questions? Call Jeanne at 446-3189.

#### Lee Hancock Performance

Lee Hancock will be performing a piano recital at the Red Lodge Community Church on Saturday, March 10 at 7:30 p.m. Call for more information: 446-1444.

#### LEPC meeting

Carbon County Local Emergency Planning Committee (LEPC) meeting at the Red Lodge Fire Hall will be held on Tuesday, March 20, 1:00. Discussion of draft Pre-Disaster Mitigation Plan is scheduled.

#### Red Lodge Area

**Community Foundation**  
Please join us for our Annual Meeting on March 22nd beginning at 11:45 P.M. for lunch and 12:20 P.M. for the presentation in the Media room at the Nonprofit Shared Services Center. Please RSVP if you are planning to attend, we hope to see you there!

#### St. Agnes Church Cum Christo

Friday March 9, 7:00 p.m., Cum Christo Holy Hour will be held. Create posters, write journals. All Fourth Dayers family and friends are invited to come and pass on the Good News of Jesus. Remember Memorials 5:45 a.m. and closing Mass 4:30 p.m. at St. Anthony's in Laurel.

#### Public Service

Commission candidate Linda Moss will be attending the Carbon County Democrats meeting Thursday, March 8, at 5 p.m. at the Regis Café. Chuck Tuoley is also scheduled to attend.

#### Komo Lecture

On Thursday March 22, at 7 p.m., the Carbon County Historical Society and Museum will host a lecture by Dr. James Komo on

bread. The remaining schedule for the mid-week evening programs is as follows: Red Lodge United Church of Christ, March 14, "The Blind Man"; and Calvary Episcopal, March 21, "Nicodemus". The evenings offer an opportunity for persons from differing traditions to discover the many commonalities that are shared by people of faith. For more information, or if you have questions, please contact one of the participating churches.

#### Fish Fry

St. Agnes Catholic Church Fish Fry will be March 16 in the Social Hall of the Church from 5 p.m. - 7 p.m. Dinner will be fish, chips, coleslaw, dessert and shamrock cookies, Irish soda bread, marbled rye bread and beverages. Prices are adult \$6; children 6-12 \$3; 5 and under free; family ticket \$30. Located 1 North Word, Red Lodge.

#### NP Reception and Vitamin D Discussion

Beartooth Billings Clinic will be hosting a Welcome Reception for Nurse Practitioner Patricia (Pat) Lage on Tuesday, March 20 from 3:30 p.m. - 6:30 p.m. at the new medical facility. Pat joined Beartooth in December. The public is invited to enjoy light snacks and wine with Pat in the Clinic's lobby. At 6 p.m., Pat will give a brief presentation on the value of "Vitamin D: The Sunshine Vitamin" in the second floor Kane Conference Room. For more information, please contact Maggie Kania, Community Relations Coordinator at Beartooth Billings Clinic, 446-0616.

#### QiGong and Tai Chi Classes

Classes will begin March 8 on Thursday evenings and will be held at the Community Church located at 308 S. Broadway. QiGong begins at 6:30 p.m. and 7:15 p.m. for Tai Chi. Students are encouraged to attend both classes and to wear loose comfortable clothes and flat shoes. Donations welcomed. For additional questions, contact 406-671-6290 or 6289.

#### Food Bank meeting

The annual meeting of the Carbon County Community Food Bank/BareTooth Cupboards will be held March 12 at 5 p.m. at Red Lodge City Hall. All members are invited to attend. Members include those who have donated food, money or time. For more information please visit BareTooth Cupboards website at baretoothcupboards.org or call 446-1255.

#### Veteran's Meeting

On March 12 the Granite Peak VFW Post 4725 will be hosting to get together at the Elks Lodge in Red Lodge at 7 p.m. All veterans eligible for membership and the Ladies Auxiliary are invited.

#### Hospice Volunteers Needed

Beartooth Billings Clinic Hospice is seeking caring neighbors interested in giving the gift of time to enhance the quality of life of those living with a terminal illness. Volunteer activities include reading, light cooking, writing letters, playing games, visiting, sharing life stories and general friendship. If you wish to make a difference in someone's life, please attend our free volunteer training, Wednesday and Thursday, March 21 - 22, from 9 a.m. - 4 p.m. at the Buckeye Garage Steak House, located at 117 N. Main in Bridger. Lunch will be provided to the trainees both days. Please call Sherry Feas at Beartooth Hospice, 446-0660 to reserve your seat.

#### Red Lodge Forum

Our next meeting will be Tuesday, March 13 at the Regis Café. The café is located in Red Lodge at the corner of 16<sup>th</sup> Street (a right hand turn off main) and South Word Ave. As before we'll start eating around 5:30 p.m. (order ahead) and begin our featured presentation around 6 p.m. Any questions call: 425-2389.

#### Sexual Assault Survivors Advocate Training

On March 22, 23 and 24, Domestic and Sexual Violence Services will provide 24 hours of training for volunteer advocates and community professionals who work with survivors of sexual violence. Kelly Young, Executive Director of the Houston Women's Fund, will facilitate the training, which will be held in Red Lodge. To sign up or to receive more information, contact Ed Lambrecht (446-2395 or elambrecht@dsvsnonprofits.org).

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#### Friends of the Library

The Red Lodge Friends of the Library's next Executive Board and General Membership Meeting will be held on Wednesday, March 14, at 7 p.m. at the library. The next book sale will be held on Wednesday, March 21, from 10 a.m. to 3 p.m. at the library. For information call Lee Cooper, 446-0250.

#### Quilters

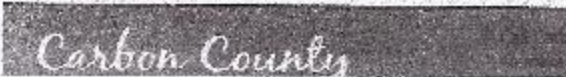
Red Lodge Charity Quilters invites all to join in hand quilting each Monday afternoon from 1 p.m. - 3 p.m. at St. Agnes Catholic Church. Presently we are quilting on a work that will be raffled at the Music Festival this June, which is the 49th year of the Festival. Bring your needle and thread (optional). All other materials are provided. We will teach you hand quilting techniques, also. All are welcome. Contact Barb at 446-1121 for further information.

#### St. Agnes celebrates school children

Middle school youth group, 6-8<sup>th</sup> grade, will meet every month after 5 p.m. mass and parish night. Social events to follow, March 23, April 22, from 5 p.m. - 7 p.m. Join the fun. Bring a friend or two. Contact: 446-0277, 446-2946.

#### Al-Anon Meeting

Al-Anon meeting every Tuesday at 7 p.m., St. Agnes Catholic Church, 1 North Word Ave., Red Lodge. Al-Anon provides help





# Carbon County News

# Carbon County Briefs

## RED LODGE

### Nondenominational Bible Meetings

Nondenominational Bible Meetings are being held at the Red Lodge Senior Citizen's Center on Sunday's at 1:00 p.m. until April 22, 2012. All are welcome. Meetings are quiet and freely given. Contributions.

### BHA Bingo

Hippity-Hop Over to BHA Bingo and win yourself a gorgeous handmade basket!! Beartooth Humane Alliance Bingo Games are for the benefit of homeless cats & dogs of Carbon County. Games will start at 1:00 p.m. at the Elk's Club in Red Lodge on Sunday, March 25. Cash & handmade basket prizes! Call 446-3500 for further details.

### Red Lodge Senior Center

The Red Lodge Senior Center will be hosting a coffee hour from 1:00 p.m. to 2:00 p.m. with coffee and cookies. Sunday, March 18. Come, socialize and enjoy refreshments.

### Free Bow Hunter

Education Classes  
Class held at Mountainview Elementary. Starts March 26. Space is limited, adults and children welcome. Call Robb Nagler, 425-0163.

### Carbon County Historist Society

On Thursday March 22, 2012 at 7 p.m., the Carbon County Historical Society and Museum will host a lecture by Dr. James Kane on an outbreak of gastrointestinal illness which occurred in Red Lodge from mid-June through early August of 1980. This outbreak affected approximately 700 people and the possible culprit was identified as warner born Giardia lamblia. The Museum is located at 524 N. Broadway in Red Lodge, Montana. This lecture is free and open to the public. For more information please call the Museum at 446-3667.

### Beartooth Nature Center

Thank you Red Lodge for your ongoing support of The Beartooth Nature Center. We wouldn't survive without all your generous support! BNC is always in need of the following items:

- Domestic meat donations: beef, chicken, turkey, pork (please no wild-caught game or fish)

- Dog food - dry and wet
- Cat food - dry and wet
- Wood chips
- Use of a wood chipper
- Pea gravel
- Sturdy dog toys

All donations are tax exempt and can be dropped off at BNC. We are open 10-2 every day. For other drop off times, call ahead. (406) 446-1133 or www.beartoothnaturecenter.org.

### "Spring Fling"

St. Agnes PCW "Spring Fling" Craft Bazaar Bake Sale will be held Saturday, March 24, from 9 a.m. to 3 p.m. at St. Agnes Catholic Church. A lunch of sandwiches, soup, salad and beverages will be available for purchase. Many wonderful baked and homemade goodies will be for sale at the famous St. Agnes Bake Sale. Over 25 crafters and vendors will have tables with many gift items, handcrafted wood decoys, jewelry, vases, hand-dyed fishing flies, home-canned items, gifts for pets. Gift and basket baskets, and many other goods for purchase. Join your friends and neighbors for food, fun and fellowship.

**Local Emergency Planning Committee (LEPC) meeting**  
Carbon County Local Emergency Planning Committee (LEPC) meeting at the Red Lodge Fire Hall on Tuesday, March 20, 1:00. Discussion of draft Ordinance #146418.

### Red Lodge Area Community Foundation

Please join us for our Annual Meeting on March 22nd beginning at 11:30 p.m. for lunch and 12:30 p.m. for the presentation in the Media room at the Noncraft Shared Services Center. Please RSVP if you are planning to attend, we hope to see you there!

### Slide for Pride

TMP265 is holding an ski event at the Red Lodge Nordic Center on March 17 from 11 a.m. to 3 p.m. This event includes ski touring lessons and a chili feed. About 60 people are expected. For more information, contact Suzie Kades at 446-208-1167.

### Red Lodge Clay Center hosts renowned Welsh ceramicist Walter Keeler

Walter Keeler will present a midweek lecture at the Red Lodge Clay Center Gallery tomorrow, Saturday, March 10 at 1 p.m. After the lecture all will have a chance to visit with the artist, perhaps pick up an autographed copy of his book, check out the gallery and share in a nosh. This event is FREE and open to the general public. For more information 406-446-3593

### Community Pint Night

Community Pint Night to benefit Red Lodge Chamber, March 20 at Sam's Tap Room.

### Wednesday Evening Worship

The Red Lodge Ministerial Association invites area residents to its normal Wednesday Evening Worship and Soup Suppers. The remaining schedule for the mid-week evening program is as follows: Calvary Episcopal, March 21, "Ninthwards," blessing service. The evenings offer an opportunity for persons from differing traditions to discover the many commonalities that are shared by people of faith. For more information, or if you have questions, please contact one of the participating churches.

### Fish Fry St. Agnes Catholic Church

Fish Fry will be March 16 in the Social Hall of the Church from 5 p.m. - 7 p.m. Dinner will be fish, chips, coleslaw, dessert and shamrock cookies, Irish soda bread, marbled rye bread and beverages. Prices are adult \$8, children 4-12 \$5.5 and under free, family ticket \$20. Located 1 North Ward, Red Lodge.

### NP Reception and Vitamin D Discussion

Beartooth Hillings Clinic will be hosting a Welcome Reception for Nurse Practitioner Patricia (Pat) Loge on Tuesday, March 20 from 5:00 p.m. - 6:00 p.m. at the new medical facility. Pat joined Beartooth in December. The public is invited to enjoy light snacks and wine with Pat in the Clinic's lobby. At 6 p.m., Pat will give a brief presentation on the value of "Vitamin D. The Sunshine Vitamin" in the second floor Kane Conference Room. For more information, please contact Maggie Karas, Community Relations Coordinator at Beartooth Hillings Clinic, 446-0819.

### Qigong and Tai Chi Classes

Classes will be held on Thursday evenings and will be held at the Community Church located at 308 S. Broadway. Qigong begins at 6:30 p.m. and 7:15 p.m. for Tai Chi. Students are encouraged to attend both classes and to wear loose comfortable clothes and flat shoes. Donations welcomed. For additional questions, contact 406-671-0299 or 8285.

### Real Theology

"Real Theology" is a video/discussion series sponsored by Calvary Episcopal Church that brings interested persons together on second Sundays at 4 p.m. to watch a movie followed by discussion. Join us as we try to make sense of how to live our faith in the world. For further information, please call The Rev. Joan Yetter, 425-0384.

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**Briefing Paper—March 2012**  
**Carbon County Pre-Disaster Mitigation and**  
**Community Wildfire Protection Plan Update**

**What is a pre-disaster mitigation plan (PDM)?**

A PDM plan looks at natural hazards that the county, Bearcreek, Bridger, Fromberg, Joliet, and Red Lodge may be susceptible to and ways to lessen the potential disasters caused by those hazards. The county's existing plan, approved in 2005, is being updated to make sure the county and communities remain disaster-resistant and less vulnerable to property damage and loss of life from a natural disaster. To remain current, the state and the Federal Emergency Management Agency (FEMA) require that the plan be updated every five years. By successfully revising the plan, the county will continue to be eligible to compete for project funds. The county will also be eligible for post-disaster assistance from the state and/or FEMA, in the event of a major disaster. Adoption of the plan is voluntary, but each jurisdiction--the county and the two communities--will need to have at least one mitigation project in the plan and adopt the plan if they wish to qualify for funding and assistance.

**What is in the plan?**

The plan contains profiles of natural hazards such as flooding or wildfires, vulnerability to each hazard, and a history of past disasters. Potential losses from future disasters have been estimated. Accomplishments since the original plan was adopted are listed, and goals and projects identified by local governments, the LEPC, and the fire chiefs have been added as appropriate. The plan will also have an explanation of how it was developed, a review of other related plans, and copies of news articles and notes from meetings held to discuss the plan.

**How has the plan been revised?**

Using FEMA funds passed through the state, the county has contracted for the plan update with Beck Consulting located in Red Lodge. Working with Carbon County Disaster and Emergency Services, the county, and the five incorporated communities over the past five months, Ms. Beck and subcontractors AMEC, Inc. and Map Murals reviewed other local plans for consistency, updated the hazard profiles, and worked with elected officials and the Local Emergency Planning Committee (LEPC) to gather input and develop any needed additional goals and projects. The draft plan will be made available for a 6-week public review starting in April and comments received will be incorporated. The county will then submit the plan to the state and FEMA for technical review. Finally, Bearcreek, Bridger, Fromberg, Joliet, Red Lodge, and Carbon County will have the opportunity to adopt and then implement the plan.

**How do we offer input?**

Input is encouraged any time until the plan is submitted to FEMA for review in late May. Input from the public and knowledgeable individuals will help make the plan the highest quality possible. Hard copies of the plan will be available at the town and city offices, and the county courthouse. The plan will also be posted on the county's website: [www.co.carbon.mt.us](http://www.co.carbon.mt.us). Comments can be submitted by phone, in writing, or by e-mail to Darrel Krum, Carbon County Disaster and Emergency Services, 446-1038, [dkrum@co.carbon.mt.us](mailto:dkrum@co.carbon.mt.us), or Barb Beck at 406 446-3628, [barbbeck@bresnan.net](mailto:barbbeck@bresnan.net), P.O. Box 870 Red Lodge, MT. 59068.



## Draft Disaster Plan to be presented

The disaster history in Carbon County since the mid 1930's suggests that we will sustain a major event within of a presidential disaster declaration every 14.5 years. Every one of the county's past disasters has been the result either directly or indirectly of severe weather—including severe storms and flooding, and wildfire. Because natural disasters are costly in terms of property damage and lives, Carbon County along with the five incorporated communities is updating the existing Pre-Disaster Mitigation or PDM Plan.

"Ever since the large-scale flooding along the Mississippi where whole towns were repeatedly decimated, there has been a nationwide emphasis on trying to prepare ahead of time and where possible, avert these costly events" said Barb Beck, the contractor hired by the county to update the PDM plan. County Disaster and Emergency Coordinator, Darrel Krum, added

"We are susceptible to flooding, winter storms, drought, earth slumping and sloughing, severe summer storms, and wildland fire in Carbon County to name the major natural hazards." In fact, according to the National Climate Data Center, Carbon County experienced 248 severe weather events for the period 1960-2010 with the most frequent damaging events being from wind. Three significant events have occurred in the county in less than ten years, the flooding in Joliet last spring, the Cascade Fire, and the debris flows that shut down the Beartooth Highway in 2005. Each of these three was costly in terms of response, property damage, and economic losses.

The county's original Pre-Disaster Mitigation Plan was completed in 2005. By updating that plan, the county and its communities will be eligible to compete for project funds to address hazards and also be eli-

gible for assistance from the state and federal governments when the next major disaster happens. Beck and Krum have been working with the Local Emergency Planning Committee on the plan update and also meeting with the town councils across the county. "We've had great suggestions from the various councils and that leads to a plan that will keep residents of Carbon County as safe as possible from these kinds of events," said Beck.

The draft plan will be presented at two public meetings. The meetings are scheduled for Monday, April 2 at 2 p.m. at the Red Lodge Fire/Rescue Hall and Tuesday, April 3, at 6:30 p.m. at the Bridger Town Hall. For questions or additional information, please contact Barb Beck at 448-3628 or Darrel Krum at 448-0128. The draft plan will be posted on the county's website, [www.co.carbon.mt.us](http://www.co.carbon.mt.us), and available in hard copy at the town, city, and county offices.

CARBON COUNTY  
PRE-DISASTER MITIGATION PLAN  
PUBLIC MEETING  
Monday, April 2, 2:00 p.m.  
Red Lodge Fire/Rescue



- Anyone with an interest is encouraged to attend!
- Agenda items include; explanation of the plan/process and contents, how you can comment, and answers to questions.
- For more information, contact:  
Disaster and Emergency Services Coordinator,  
Darrel krum, 446-1038, or  
Contractor, Barb Beck, 446-3628

**Carbon County PDM/CWPP  
Public Meeting  
Red Lodge Fire/Rescue  
April 2, 2012**

**Participants**

County Commissioners: John Grewell, John Prinkki  
Beartooth Billings Clinic: Chris Benton, Mike Nordstrom  
County DES Coordinator: Darrel Krum  
Contractor: Barb Beck

**Purpose of Meeting**

Contractor, Beck, explained the reasons for the meeting as follows.

- Announce the availability of the draft plan
- Explain why the county has chosen to update the plan
- Explain what is in the plan
- Encourage you to comment on the plan
- Answer any questions

**Hand out**

Beck provided a handout dated April 2012 explaining what PDM plan is, what the contents of the plan are, when the comment period is, how to find a copy of the draft plan, and how to comment. (See Appendices) She walked through the information in the handout.

**Mitigation**

The plan has 6 goals, one for each of the local jurisdictions. There are a total of 55 projects identified—mostly by the local jurisdictions. More projects could probably be listed in the plan, but wouldn't be realistic because of the resources available. Bearcreek and Bridger have 4 projects each, Fromberg has 6 projects, Joliet and Red Lodge have 9 projects each, and the county has 23 projects.

Projects vary from educational to property protection to prevention and emergency response.

**Next Steps**

The public comment period is open until May 12. At that point, comments will be incorporated and then the plan sent to the state and FEMA for review. After approval, the local jurisdictions (county and five communities) can adopt the plan. Copies of the draft are located in each city and town hall, at the libraries, the county commissioners' office, and on the county's website. [www.co.carbon.mt.us](http://www.co.carbon.mt.us).

Barb will set up a meeting with the commissioners to discuss the draft WUI boundaries.



CARBON COUNTY  
PRE-DISASTER MITIGATION PLAN  
PUBLIC MEETING  
Tuesday, April 3, 6:30 p.m.  
Bridger Town Hall



- Anyone with an interest is encouraged to attend!
- Agenda items include; explanation of the plan/process and contents, how you can comment, and answers to questions.
- For more information, contact:  
Disaster and Emergency Services Coordinator,  
Darrel krum, 446-1038, or  
Contractor, Barb Beck, 446-3628

MEETING TIME IS **6:30 PM AT BRIDGER TOWN HALL**  
**108 S D STREET**  
BRIDGER TOWN COUNCIL AGENDA

PUBLIC MEETING

April 3, 2012

**6:30 PM Carbon County Pre-Disaster Mitigation Plan Meeting**

MINUTES:

APPROVE CLAIMS:

COMMITTEE REPORTS:

Area Parks & Recreation District Report

CITIZEN ADVISORY REPORTS:

PUBLIC COMMENT:

BRIDGER CLEANUP COMMITTEE: Joan Miller, Lillie Reamy

LIBRARY BYLAW CHANGES/FOUNDATION OF LIBRARY: Kathy Madd

FACTORY BUILDING LEASES:

LEASE TOWN BUILDING: Ron Aasterud

POLICE CHIEF APPOINTMENT:

SEWER & GARBAGE SHORTFALLS AFTER LOAN PAYOFFS:

ZONING APPLICATIONS:

PUBLIC COMMENT:

TOWN ATTORNEY: Hope Freeman

PUBLIC WORKS DIRECTOR: Tim Goldsberry

POLICE REPORT: Mike Buechler

TOWN CLERK: Deanna Hay

MAYOR: Scott DeRudder

**Carbon County PDM/CWPP  
Public Meeting  
Bridger Town Hall  
April 3, 2012**

**Participants**

Bridger Town Council (3 members), Town Clerk, Police Chief  
County DES Coordinator, County Sheriff  
Contractor: Barb Beck  
Public: 6 members of the public

**Purpose of Meeting**

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- Announce the availability of the draft plan
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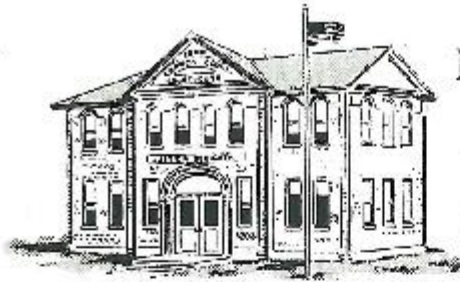
**Discussion**

Does Bridger need to adopt any DFIRMs? Barb will check. If not, that project needs to be deleted. Two typos were pointed out and will be fixed.

**Next Steps**

The public comment period is open until May 12. At that point, comments will be incorporated and then the plan sent to the state and FEMA for review. After approval, the local jurisdictions (county and five communities) can adopt the plan. Copies of the draft are located in each city and town hall, at the libraries, the county commissioners' office, and on the county's website. [www.co.carbon.mt.us](http://www.co.carbon.mt.us).

# APPENDIX F: RESOLUTIONS OF ADOPTION



## BOARD of COMMISSIONERS

COUNTY OF CARBON • STATE OF MONTANA

Post Office Box 887  
Red Lodge, MT 59068

Phone: (406) 446-1595  
Fax: (406) 446-2640

### CARBON COUNTY RESOLUTION 2012-26

#### Resolution Adopting the Carbon County Pre-Disaster Mitigation Plan

**WHEREAS**, the County of Carbon, Montana, recognizes the threat that natural hazards pose to people and property within our county; and

**WHEREAS**, undertaking hazard mitigation actions will reduce the potential for harm to people and property from future hazard occurrences; and

**WHEREAS**, the U.S. Congress passed the Disaster Mitigation Act of 2000 ("Disaster Mitigation Act") emphasizing the need for pre-disaster mitigation of potential hazards;

**WHEREAS**, the Disaster Mitigation Act made available hazard mitigation grants to state and local governments;

**WHEREAS**, an adopted Pre-Disaster Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

**WHEREAS**, the County of Carbon, Montana, fully participated in the FEMA-prescribed mitigation planning process to prepare this Pre-Disaster Mitigation Plan; and

**WHEREAS**, the Montana Office of Disaster and Emergency Services and the Federal Emergency Management Agency Region VIII officials have reviewed the Carbon County Pre-Disaster Mitigation Plan, and approved it contingent upon this official adoption of the participating governing body;

**WHEREAS**, the County of Carbon, Montana, desires to comply with the requirements of the Disaster Mitigation Act and to augment its emergency planning efforts by formally adopting the Carbon County Pre-Disaster Mitigation Plan; and

**WHEREAS**, adoption by the governing body for the County of Carbon, Montana, demonstrates the jurisdiction's commitment to fulfilling the mitigation goals and objectives outlined in this Pre-Disaster Mitigation Plan;

**WHEREAS**, adoption of this legitimizes the plan and authorizes responsible agencies to carry out their responsibilities under the plan;



**NOW, THEREFORE, BE IT RESOLVED**, that the Board of County Commissioners of Carbon County, Montana adopts the Carbon County Pre-Disaster Mitigation Plan.

Adopted this 20 day of December, 2012.

Carbon County Commissioners

  
Doug Tucker, Presiding Officer

  
John L. Grewell

  
John E. Prinkki

ATTEST

  
Marcia Henigman, Clerk and Recorder